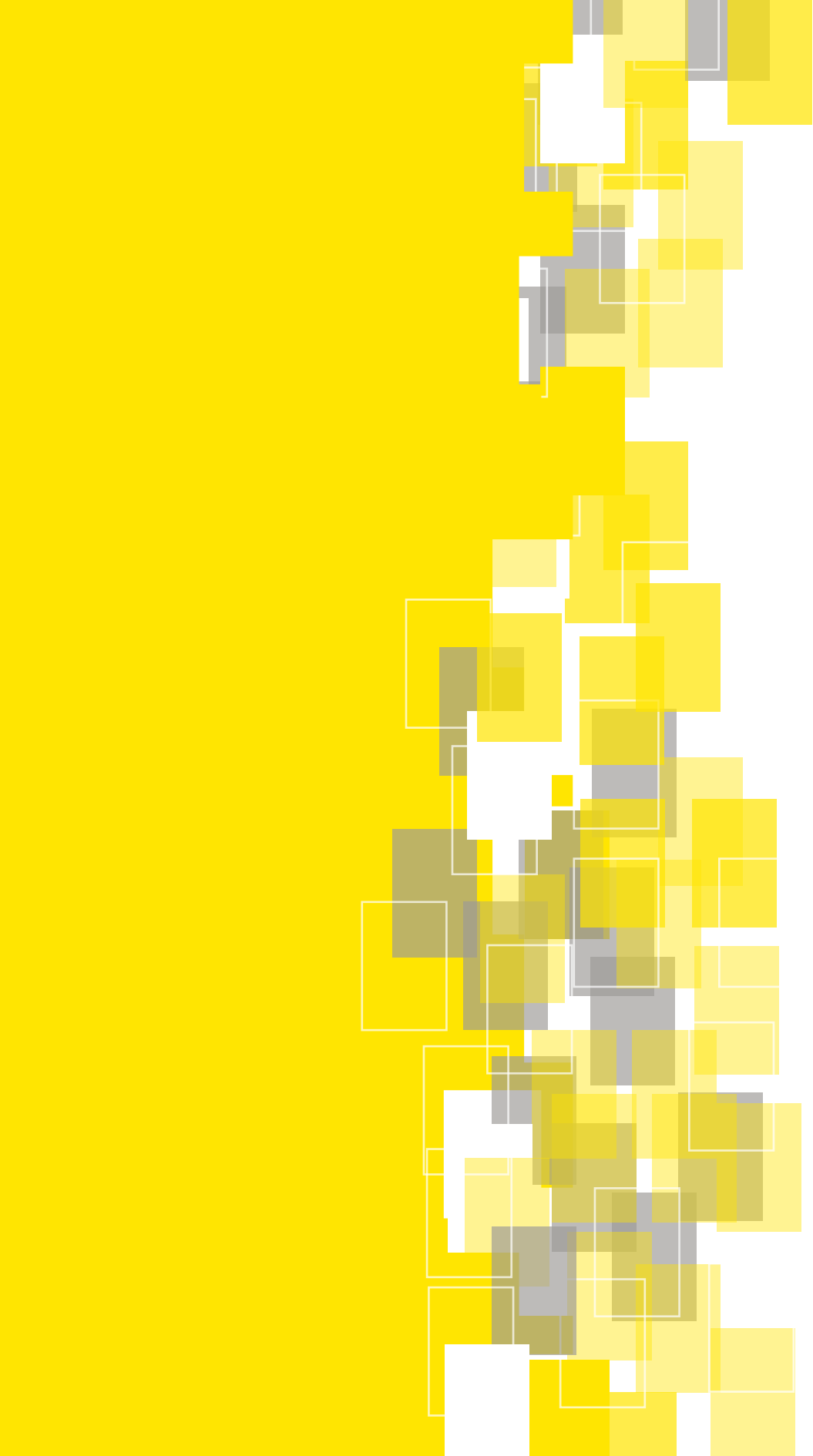
# Future of Media

Bit Bang 6

**Yrjö Neuvo, Erkki Ormala & Meri Kuikka (eds.)**

Aalto University's Multidisciplinary Institute of Digitalisation and Energy (MIDE)



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## The Future of Media

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# Table of Contents

# Foreword

This book is the 6th in the Bit Bang series of books produced as multidisciplinary teamwork exercises by doctoral students participating in the course *Bit Bang 6: The Future of Media* at Aalto University.

The course was facilitated by Professor Yrjö Neuvo, Multidisciplinary Institute of Digitalisation and Energy (MIDE) program leader and former Nokia Chief Technology Officer; and Professor Erkki Ormala, former Vice President of Nokia.

25 students took part in the course during the academic year 2013-2014. The students were selected from diverse academic and cultural backgrounds: 11 nationalities were represented by students from the Aalto schools of Electrical Engineering, Arts, Science, Engineering and Business, leading to spirited in-class discussions and multidisciplinary teamwork.

The learning objectives of the course centered on teamwork, multidisciplinary collaboration, and gaining global perspectives on industry and business foresight on the future of the media industry. These were achieved through weekly lectures from visiting industry leaders, writing the chapters of this book, and other teamwork assignments. As textbook material and to support class discussions and teamwork the students used *Media Now: Understanding Media, Culture, and Technology* by Straubhaar, LaRose and Davenport as well as selected chapters from earlier Bit Bang publications.

Working in teams, the students set out to answer questions related to the changing media industry. The media industry is currently undergoing its biggest revolution since the invention of the printing press: digitalization is fundamentally changing the media landscape, and the distribution channels and revenue models of the print and broadcasting industries are being challenged. Digital convergence has changed the media value chain, and the Internet and social media have introduced new players to the game.

By the end of the autumn term, four teams had produced four points of view on the future of media published in this book: *Power to the People: Media Users' Capabilities and Motivations to Influence Content Production and Distribution*; *When Media Companies Move to the Cloud: What Happens to End-users if They Lose Control*

*over Their Personal Data; Crowds and their Disruptive Influence on the Development of Journalism,* and *Television's Next Top Business Model: Personalized and Pervasive*

At the start of the spring term, the groups were reshuffled and set to tackle new topics: *Junior's day at school in 2025: How Will Digital Media Impact Education, Transparent Media Driving Spacechip Earth, SMARTWEAR: Future Smart Wearables to Improve our Health and Media Communications,* and *Ethical Personalization Act 2025*. During the spring term, the course also visited San Francisco and Palo Alto for a week-long study tour. The tour program and short reports on the company and institution visits are available in the appendices of this book.

The Bit Bang series of courses is funded by the Multidisciplinary Institute of Digitalisation and Energy (MIDE). The unique nature of the course has generated lots of positive feedback from the academic community, and produced an extensive network of alumni connecting doctoral student sand graduated doctors. We are very proud of the community we have been able to gather around this unique and though-provoking course.

We wish to give our special thanks to this year's tutors and Bit Bang alumni Zhongliand Hu, Helena Jin, Jan Kallenbach and Vesa Kantola for their tireless work with their teams and valuable advice given whenever needed. We also wish to thank our esteemed guest lecturers representing government, industry and academia. Their presentations and discussions gave valuable insight into the issues studied, and their role was essential for the success of the course.

We wish you captivating moments with the book!

**Yrjö Neuvo**, **Erkki Ormala** and **Meri Kuikka**

# *The Future of Media*

# Power to the People: Media Users' Capabilities and Motivations to Influence Content Production and Distribution

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**Abstract.** Media users' increasing participation and collaboration in media content production and distribution is challenging the traditional roles, practices and power of media producers. In investigating the overall framework of changes that are revolutionizing the media industry, this chapter analyses the transitioning power relations between media producers and media users today and into the next ten to fifteen years. It attempts to shed some light on how and why users, especially the more active users such as pro-ams (professional amateurs), may increase their participation in media content production and distribution in the future. In doing so, this

chapter discusses the motivations of the major players, as well as the current and future trends both limiting and enabling user power, and concludes with a selection of insights based on recent studies on the media industry as well as interviews with media players. This chapter offers implications for media organizations, for this transitioning participatory user-producer content production process contributes to both cost-efficiency and therefore profitability within media organizations. In conclusion, this chapter contends that more power to the people may, in actuality, lead to more power to media producers.

**Keywords:** media use, media users, pro-am, power, motivation, producers

## 1. Introduction

In analysing the transitioning power relations between media producers and media users as they each endeavour to produce and distribute content, this chapter looks at the overall framework of changes that are revolutionizing what Nick Couldry (2009) calls the "whole mass media paradigm in the 21st century". We have shifted from one-way content delivery from producers to users to a multiform interactive relationship. Media companies no longer offer ready-made content for receivers but instead provide users with platforms in which to contribute and distribute content, such as Facebook, Flickr, Skype and Twitter. Clearly, media user numbers are increasing exponentially, as are levels of user participation in media content production and distribution. Whilst many media producers are taking advantage of these changes, some media producers in sectors such as the news media continue to struggle to adequately make the most out of this shift, and their revenues are suffering as a result.

*Media* is a difficult and often loosely used term – partly because of a lack of consensus over its definition, partly because it is constantly undergoing significant change, and partly because the term crosses multiple industries and academic disciplines. Henry Jenkins (2006:13–14) addresses this difficulty by distinguishing two aspects of *media:* First, media are delivery technologies, such as radio or television. Second, media are cultural systems: social and cultural practices that have evolved around a certain technology. Media as delivery technologies come and go, but cultural systems just shift to new platforms. For example, the printed newspaper, as a delivery technology, most likely will become a relic by 2025, but the cultural practice of newspapers will find new platforms. Web 2.0 and other new forms of media are revolutionary as cultural systems: among others they are fundamentally changing the relationship between producers and users.

The hybridization of the roles of (those players labelled as) media producers and users has been widely discussed in academic fields such as media studies and social sciences (e.g., Benkler, 2006; Chadwick, 2013; Couldry, 2009; Jenkins and Deuze, 2008; Jenkins, 2006). Jenkins (2006:2) describes this phenomenon as a convergence

of culture "where old and new media collide, where grassroots and corporate media intersect, where the power of the media producer and the power of the media consumer interact in unpredictable ways". The concept of convergence embraces technical, industrial, cultural and social changes.

This chapter proposes that increasingly these roles are merging, making it problematic to view them as completely separate (Jenkins, 2006:3). The growth of a more participatory culture today and especially into the future is speeding up the process of convergence of these roles and is a catalyst to increasing collaboration. This intermingling of the roles in media content production and consumption has been described with many hybrid concepts, such as 'produsage' (production and usage), 'prosumption' (production and consumption), 'prosumers' (producers and consumers) and 'pro-ams' or 'amafessionals' (professional amateurs) (e.g., Bruns, 2010, 2012). The Oxford English Dictionary defines a *pro-am* as: "An amateur who does something in a professional way, or to a professional standard; a 'professional amateur'."

Jenkins and Deuze (2008) consider that the earliest insights into this phenomenon of convergence are paradoxical: "audiences and industry both seem to be gaining – and losing – power, media control seems to be concentrating and dispersing in the same transitional moment". Drawing on Benkler (2006), Jenkins and Deuze (2008:5) describe it as a *hybrid media ecology* "within which commercial, amateur, governmental, non-profit, educational, activist and other players interact with each other in ever more complex ways. Each of these groups has the power to produce and distribute content and each of these groups is being transformed by their new power and responsibilities in this emerging media ecology."

Media users are increasingly transitioning into a group helping to generate and circulate media content rather than remaining in their traditional role as a market for corporately produced products. More and more, users are demanding the right to participate and this, combined with their networked or collective power, is building a destabilizing force that is threatening consolidation, standardization and rationalization in the media world. As Jenkins and Deuze put it, "Consumers are using the grassroots channels offered by digital and mobile technologies to assert their own control over cultural flows." In this way, individual media consumption is giving way to a more networked form of production and consumption – a more socialized or communal media (Jenkins and Deuze 2008:9; Jenkins 2006:255). Castells talks of media users as "communicative subjects" who are "not isolated entities; rather they interact among themselves by forming networks of communication that produce shared meaning" (2009:132).

This particular phenomenon has implications for both the media industry and society as a whole, for it speaks to the overarching challenge of democracy itself, in which the willing and equal participation of citizens in open and free conversations about societal life is encouraged and facilitated by both corporate and government leaders. Today's participatory media environment offers us "new metaphors for co-operation, new faith in the power of networked activity, and new evidence of our

ability to participate actively in the authorship of our collective destiny" (Rushkoff, 2003).

This chapter contributes to the ongoing discussion on media convergence and collaboration between media players' roles. Reflecting the title of this chapter, we look at this transitioning phenomenon through the lens of media users, particularly those who are more active in the participation of media content production and distribution, such as pro-ams. In doing so, we hope to shed some light on how and why users may increase their participation in open discourse through media channels in the future. Therefore we ask: How will this symbiotic power relationship between media users and producers evolve into the 2020s and beyond? We discuss the motivations of the major players, as well as the current and future trends both limiting and enabling user power. We conclude with a number of perspectives and predictions on what the future media content production and distribution ecology may look like in the future.

## 2. *Motivation to Influence Media Content*

Why do media users, particularly the more active ones, participate in media content production and distribution today? And what would motivate them to participate in the next ten to fifteen years? These are critical questions, especially for media producers who acknowledge their dependence on user participation in the future. Therefore we begin our discussion with an analysis of the motivational influences of media users and producers, such as monetary rewards, career development, recognition and pure fun, and we attempt to offer insights into users' motives to participate in the future.

Motivational drivers that apply to different types of media have been addressed across diverse fields ranging from a qualitative perspective (eg., Markman, 2012; Teh, 2012; Väätäjä, 2012) to utilizing various motivation theories as an explanatory aid. A common approach among the latter has been an attempt to understand individuals' intrinsic and extrinsic motivational factors in different types of media consumption and production (Malhotra, Galletta and Kirsch, 2008). We contend that self-determination theory (SDT) takes a more thorough perspective, especially on extrinsic motivation, providing further insight into users' motivation (Deci and Ryan, 2000). The underlying assumption in this chapter is that the motivation to produce and consume media content remains the same despite the type of media or the era in which it takes place.

### 2.1. Motivation-related Theories and Models

Self-determination theory (SDT) identifies three basic needs relating to innate psychological nutriments which are essential for ongoing psychological growth, integrity and well-being: competence, relatedness and autonomy. These three needs are essential for an understanding of the motivation behind what users produce (i.e.,

media content) and why they participate (i.e., media production processes). These three needs refer to innate and life-span tendencies towards achieving effectiveness, connectedness and coherence.

In contrast to the many empirically-based theories that treat motivation as a unitary concept, SDT instead focuses on the degree to which motivation is self-determined versus controlled (by others) (see Fig. 1). Intrinsic motivation concerns active engagement with tasks that people find interesting and which promote growth. Yet this active engagement requires the nutriments of need fulfilment, and if the degree to which users experience need satisfaction diminishes, they will become less interested in the activity. Overall, intrinsic motivation is facilitated by conditions that are conducive towards psychological need satisfaction, whereas undermining of intrinsic motivation takes place when conditions tend to thwart need satisfaction. Cognitive evaluation theory (CET) asserts that the underlying intrinsic motivation is the psychological need for autonomy and competence, so the effects of an event such as a reward depend on how it affects perceived self-determination and perceived competence (Deci, Koestner, and Ryan, 1999). Relatedness is not as closely linked to intrinsic motivation, but it will most likely flourish in contexts characterized by a sense of relatedness (Deci and Ryan, 2000).

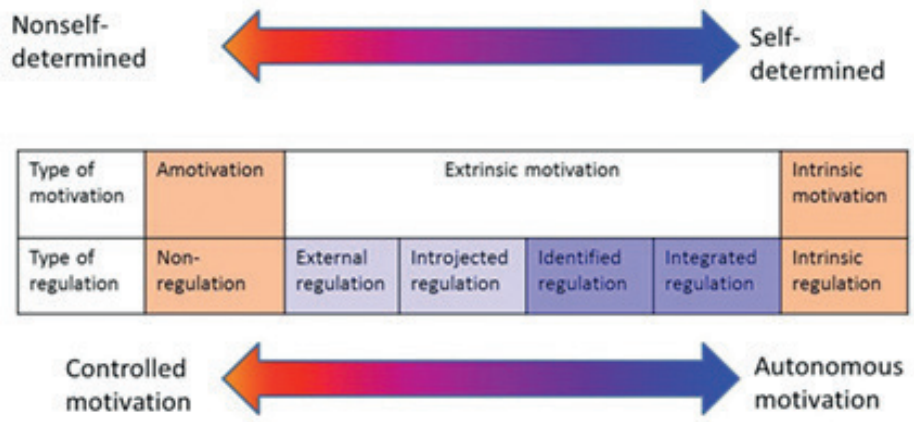


**Fig. 1.** ***A Self-determination Theory (SDT) Perspective: From Amotivation to Intrinsic Motivation (Deci et al., 1999)***

The weakest form of extrinsic motivation are, e.g., monetary rewards (external regulation), suggesting that a user's participation in media content production and distribution does not necessarily lead to satisfaction or enjoyment for the user (intrinsic motivation). In the next phase users recognize and accept the underlying value of behaviour (introjected regulation), but the goal is still instrumental (e.g., losing weight, living healthier lives) rather than being done solely as a source of spontane-

ous enjoyment. Closest to intrinsic motivation occurs when users will have accepted the regulations and brought them into harmony or coherence with other aspects of their values and identity (integrated regulation). Users will be happy to participate in media production in which they can recognize and accept the underlying value. However, unless those external values are fully integrated, there is a high probability that they will drop out of participation. User participation is highest when all the regulations are fully internalized and functioning intrinsically.

## 2.2. Factors Affecting Motivation Levels

Vallerand's (1997) hierarchical model of intrinsic and extrinsic motivation builds on SDT and adds three hierarchical levels of generality: global, contextual and situational. Each of these factors has an effect on the perceived outcome. At the lowest (situational) level, intrinsic motivation is effected by various situational variables (e.g., rewards and constraints), whereas at the contextual level the focus is on the determinants and outcomes associated with more or less generalized intrinsic and extrinsic motivation towards specific life contexts (e.g., media consumption). Global motivation is more related to personality and the underlying intrinsic and extrinsic factors. Top-down and specificity effects define the functional guidelines for the hierarchical model meaning that situational motivation in a specific context should be effected only by contextual motivation related to that specific activity at that very moment when a user is engaged in that activity. Contextual motivation can be effected by global motivation, and situational motivation can be effected by longitudinal basis.

Vallerand's (1997) hierarchical model of intrinsic and extrinsic motivation takes current knowledge of organizing and understanding the basic mechanisms underlying intrinsic and extrinsic motivational processes and applies it to media consumption and production. Research conducted within media environments has addressed both situational as well as contextual level motivations. Situational motivation deals with immediate feelings during engagement in certain media activity, whereas contextual motivation relates to the appeal of specific types of media.

## 2.3. Categories of Media Users

In analysing the various motivational factors influencing media users to participate in media content production and distribution, we must attempt to categorize them. This chapter contends that categorizing media users into active and inactive segments is far too simplistic. Hallahan (2000a, 2000b) divides users into inactive, aware, aroused or active, thus providing more of a continuum of engagement rather than a placement of users into static groups. Therefore we argue that aware, aroused and active media users emerge from inactive users. Of course, this also depends on the opportunity, motivation and context of media participation. The only influence that inactive members are likely to have over media content production and distribution

is through what could be described as "voting with their feet". This is because they do not normally participate in any media engagement activities apart from consuming content, such as reading the daily news. Reasons for this inactivity might be that they either have not tried to participate or they lack the motivation to do so. Media users who are aware take a slightly more proactive approach, such as when 'liking' others' comments or updates in social media platforms.

A user's need to participate in media content production and distribution, such as online media conversations, can be linked to relatedness, one of the basic needs described by SDTs. Aroused users, on the other hand, take this participation yet another step further, as they have a tendency to share and comment on news stories. Their engagement might be due to sheer pleasure or the desire to look competent in the eyes of others. Bruns (2012) offers an expanded view of pro-ams (professional amateurs) who "take it a step further" than active amateurs because they are committed and skilled and work to professional standards. The difference between these two groups (active amateurs and pro-ams) is in the level of their expertise in their specific fields and the strength of their motivational drivers. For example, the intrinsic motivation of pro-ams is stronger. Hallahan (2000b) classification has been further expanded to include active users (amateurs and pro-ams) and professionals (Fig. 2). This reflects Deci and Ryan's (2000) continuum of motivations in relation to professionals. The intrinsic motivation of professionals is not necessarily high, as they produce media content largely because they are paid a salary to do so.

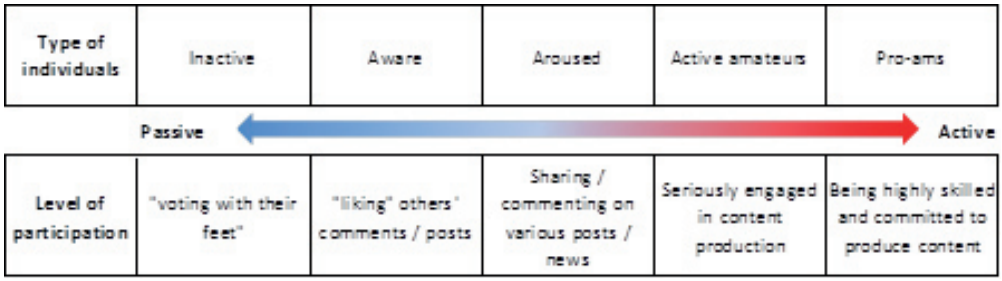


**Fig. 2.** ***Categories of Media Users and Their Differences in Their Participation to Media Consumption/Production (Bruns, 2012; Hallahan, 2000b)***

## 2.4. Motivational Drivers Among Categories of Media Users in Different Media Surroundings

As stated earlier, the underlying motivational drivers remain the same despite the media surroundings. Some types of media facilitate higher levels of participation than others, and therefore motivation analyses need to take these differences into

consideration. Besides the varying functionalities and purposes of different media, media also offer different underlying reasons for user participation. Some types of media, such as news media, are better suited to the sharing of information. This suits active amateurs and pro-ams whose reasons for participating include the sharing of knowledge or information related to specific topics. On the other hand, users' reasons to distribute media content through Facebook are more related to social networking and relationship drivers. According to Vallerand's (1997) model, intrinsic and extrinsic motivations exist in each situation and context, and this affects users' levels of participation.

## 2.5. Inactive and Less Active Users

Inactive users are in the majority, and they remain elusive and invisible (Hallahan, 2000a). They may read the news, follow content on Twitter or Facebook, or occasionally read blogs. However, they are not interested in engaging beyond simple passive consumption. Their interests lie merely in acquiring sufficient information from media outlets to meet their needs. Underlying motivational issues, for example, can be related to "knowing what others are talking about", which links to SDT's relatedness. Inactive users also seem transparent as they do not comment or give feedback and they tend to "vote with their feet" if they cannot find the information they are looking for. Media companies can follow these inactive users by measuring content consumption on their Web pages via 'clicks'. Users who are inactive remain inactive as long as the information they read, watch or listen to is not personally relevant to them. When personal interests arise, inactive users can transition into aware, aroused or active.

As mentioned earlier, users in the aware category tend to be those users who click "like" on Facebook to let others know their opinion. This may be a very casual activity and does not need to be driven by intrinsic motivation. They simply may want others to know they have seen a post, for example. People who are aware are more motivated to comment on others' posts or share what they have read. They are driven by stronger motivational drivers, for example, by a passion for certain topics. A common theme among inactive, aware and aroused users is that they do not produce content; though some share or distribute content (mainly in social media). Note that aware and aroused users may have remained inactive if technology had not aided user-to-user communication (e.g., Facebook).

## 2.6. Active Users

A common element among active amateurs and pro-ams is that they produce media content. The difference between them is in their level of participation, and this is directly linked to the level of their motivation. Their intrinsic and extrinsic motivation can be defined by the outcomes from their media activity: doing it for mere fun

(enjoyment, satisfaction) or in order to attain some separable outcome (Agrifoglio, Black and Metallo, 2010).

Users tend to become more engaged when they allocate more time to media participation. In addition, active users also may need to learn new skills and processes, especially when engaging in media with which they are not familiar. Agrifoglio et al. (2010) argue that perceived usefulness, enjoyment and playfulness positively affects the intention to use an information system, such as a social media platform. Venkatesh (2000) introduces two subcategories for intrinsic motivation in his investigation of the role of intrinsic motivation in technology acceptance: playfulness (degree of cognitive spontaneity in computer interaction) and enjoyment. Markman (2012) also notes technology motives (e.g., interest in technology), content motives (e.g., filling a niche market or love of a subject matter), personal motives (e.g., seeking attention or enjoyment) and interpersonal motives (e.g., joining a movement) when observing the underlying reasons why users start podcasting.

Continuing to produce content requires time and strong drivers for pro-ams as they tend to produce and distribute content during their leisure time (after work). Even though leisure is often regarded as a zone of freedom and spontaneity in contrast to the necessity of work, pro-am activity is characterised also by a sense of obligation and necessity (Leadbeater and Miller, 2004). According to Leadbeater and Miller, the expertise of pro-ams builds up over time, reflecting one of SDT's basic needs, namely competence (Deci and Ryan, 2000).

According to SDT, rewards are the lowest motivational factor. The founder of the popular U.S. blog Daily Kos, Markos Moulitsas, once stated that personal satisfaction is the only payment bloggers will ever see (Bruns, 2013). Teh (2012) discovered in his research regarding pro-am photographers contributing to *Malaysia Travel Magazine* that their motives are not money (even though they are paid for their contribution), career enhancement or skill improvements (trying to meet professional standards). Contradictory findings related to rewards also have been presented, for example, by Väätäjä (2012) who discovered that readers' strongest motivators to participate in hyperlocal news content creation were fun, the opportunity to receive monetary reward, and informing others of local issues. Scholars have found that monetary rewards are not considered a strong motivational factor among active users starting to produce content, but they may become more influential if the time spent producing content starts occupying too much of their time.

Motivational factors discussed most often in academic literature are enjoyment, fun and satisfaction. Teh (2012) argues that whilst active amateur photographers' rewards are related to hobby, play and entertainment, pro-ams' rewards are related to enrichment, gratification and accomplishment. Bruns (2013) mentions that personal satisfaction can be experienced in many forms, one of which is the personal merit given to producers from their individual contributions. Zhang and Zhu (2006) found that Wikipedia contributors' motivation included a sense of meaningfulness, self-determination and a sense of relatedness. Their study highlights that intrinsic

motivation can play an important role in participation levels in online communities. Markman (2012) adds audience feedback, recognition and fame to the list of motives of users who continue podcasting.

To summarize, whilst the motivation to produce content is a combination of extrinsic and intrinsic motivation factors across different types of media, clearly the most important drivers are perceived usefulness, enjoyment and satisfaction. Active amateurs and pro-ams enjoy producing content in the right context because they receive instant satisfaction from becoming engaged in the activity itself as well as prolonged satisfaction from what they have produced. The closer pro-ams transition to the level of professionals, the more time they need to spend on content production and distribution, and therefore monetary reward also becomes a driving factor. Paradoxically, monetary rewards can also thwart intrinsic motivation (Deci et al., 1999), which also needs to be considered when evaluating the underlying factors of participation.

## 2.7. Media Producers' Motivation to Participate

The motivation of media producers to produce content in collaboration with users also is an important consideration. Increasingly, producers are recognizing the benefits of user participation in the production and distribution of content. Indeed, many are actively seeking this collaboration, such as through crowd-sourcing and in sourcing photos and videos from individual active users. As many pro-ams are highly knowledgeable in their specific fields, the benefits for media producers to utilize their knowledge in the production of content includes an expansion of their own knowledge base in cost-efficient ways. For example, the BBC has adopted a pro-am model in which users collaborate with producers in content creation (Pantti and Bakker, 2009).

News producers' motivations to use amateur-contributed content can be twofold: to foster consumer loyalty and to generate low-cost content (Pantti and Bakker, 2009). Fostering consumers loyalty is linked to one of consumers' basic needs (SDT), relatedness, and news producers are exploiting that to keep consumers satisfied. Generating content, on the other hand, can be seen as exploiting consumers' wishes to produce content, which is related to another basic need in SDT: their desire to feel competent. Many news organizations incorporate non-professionals' photos and video material into their own content (e.g., in the context of breaking news). They also collaborate with users by monitoring the Web and social media to attempt to anticipate tomorrow's news.

# 3. *Power to Influence Media Content*

So far we have attempted to shed some light on how and why users, especially the more active users such as pro-ams, participate in media content production and distribution. An analysis of the motivations of these major players in today's media ecology is important as it has a bearing on the ongoing power struggles between them. In seeking to investigate the influence media users and producers can and do have over each other and therefore over media content production and distribution, we now analyze the construct of power as it relates to the future media content production and distribution ecology. Whilst Foucault (1979) asserts that power is an always-present characteristic of social relations, the use of power has changed over time. In today's information age, power is exercised less and less through the overly coercive behaviour or thinly veiled threats of violence from past eras. Rather, today power exists more in the capacity of actors to affect the minds, and therefore the resultant behaviour, of others. In this sense, the media sector and the actors who participate in it have an enormous reservoir of power at their fingertips.

## 3.1. Power Relations Between Media Producers and Users

The way in which information flows and the direction it takes affects power relations between players in the media industry, especially between users and producers. According to Chadwick, players "create, tap or steer information flows in ways that suit their goals and in ways that modify, enable or disable others' agency across and between a range of older and newer media settings" (Chadwick, 2013). Many media companies are adapting to the times by attempting to accelerate this flow of media content across delivery channels to expand revenue opportunities, broaden markets and reinforce consumer loyalties and commitments. At the same time, users are learning how to make the most of media technologies while interacting (and co-creating) with other users, and in doing so they are harnessing the flow of media content more fully under their control. Sometimes these two forces, categorized here as media producers and media users, reinforce each other, creating closer, more rewarding relations between them. At other times they conflict, resulting in constant renegotiations of power in this new media ecology.

Chadwick (2013) suggests that "actors in this [hybrid media] system are articulated by complex and ever-evolving relationships based upon adaptation and interdependence and simultaneous concentrations and diffusions of power". It is an ever-transitioning symbiotic relationship; they need each other, and yet they are often opposites needing to feed off each other in an increasingly complex ecological system of power balances.

Whilst increasing user participation in media content production and distribution has handed significant power over to users, the new media convergence ecology also sees media producers attempting to maintain and even regain power over produc-

tion and circulation. For instance, driven by economic forces, media producers have sought to exploit their advantages, such as by forming media conglomerates (Jenkins, 2006:254, 259.)

Media content has power implications in the way that it determines what view of the world – or versions of reality – are presented to users (Risberg, Tienari and Vaara, 2003:124). According to Fiske (1989a), news as knowledge creation is power. Particular values and worldviews are produced, reproduced and transformed in media discourses, while others are excluded from them (e.g., Allan, 1999; Bennett, 1988; Carvalho, 2007; Fairclough, 1995) This also relates to agenda-setting theory, which contends that the news media traditionally sets the public agenda within society. Consequently, users' points of view are limited (or framed) by media producers. In this top-down hierarchy of information flow, media users' power is limited. In this setting, media producers have the capacity to promote particular versions of 'reality' while marginalizing and excluding others (Vaara and Tienari, 2002).

This points to the relevance of the news media's historic role as gatekeeper, in which potential news content must first pass through a series of editor- and journalist-controlled checkpoints before it is broadcast or published for public consumption. However, this role is currently being replaced by the producer's role as *gatewatcher*. Where once gatekeeping worked well for media producers because users were not able to contribute much news content and therefore users held very little power, more recently media producers are being confronted with the phenomena of rising mass self-communication (consumer-to-consumer communication), in which they have less influence over the formation and distribution of media content. Thus they, in some ways, become mere 'gatewatchers' with less power at their disposal, observing production, distribution and consumption of content from the sidelines.

The media's increasing influence in assigning particular meanings to 'reality' in society has been critically scrutinized by linguists (Chomsky, 1999; Fairclough, 1995) and sociologists (Bourdieu, 1998a, 1998b). In the same vein, news media (producers) can be seen as both sense-maker and sense-giver (cf. Gioia and Chittipeddi, 1991; Weick, 1995): sense-maker in the sense that media takes part in developing a meaningful framework for understanding a complex phenomena, and sense-giver in the sense that it also attempts to influence sense-making and meaning construction among its audiences towards specific definitions of 'reality' (Hellgren, Löwestedt, Puttonen, Tienari, Vaara and Werr, 2002). This gives media producers tremendous power, which makes the study of media influence critical in any society. For instance, in a democracy we should be particularly watchful over how much influence media producers exercise over audiences. At the same time, we should also seek to encourage more participation from individual users as this helps lead to a healthier democracy.

### 3.2. Power Through Participation

Power is the key defining element of participation, for participation enables and is a catalyst for power. Indeed, participation is contingent on and is itself a part of the power struggles in society (Carpentier, 2012:170–171). It stands to reason that the level of a user's participation can affect his/her power over media content production and distribution. If a user is very active in contributing and distributing content, this level of participation increases that user's level of power. Extreme power imbalances between players tend to be characterized by minimalist participation, whereas increasing equalization of power relations tends to be characterized by maximalist participation (Carpentier, 2012:175).

Opportunities to participate in media content production and distribution vary between producers and users. For example, corporations and people working within established institutions traditionally have enjoyed more opportunities to participate than individual users or even groups of users and communities of users. Historically this has given them opportunities to exert great power over users. Opportunities to participate also vary between individual users, because some have better opportunities to participate than others (Jenkins, 2006:3).

A central phenomenon supporting media users' power – or an alternative source of media users' power – is collective intelligence, which is born out of the collective process of media consumption (Jenkins, 2006:4). 'People power' exercised through online media channels is alive and well. Indeed, it is thriving today, especially when individual users band together for common purposes. Jenkins (2006:260) argues that, "The politics of participation starts from the assumption that we may have greater collective bargaining power if we form consumption communities." This alludes to the common practice of users actively forming communities in order to exercise power, whether content production and distribution power or purchasing power.

In analysing power relations between media producers and users, factors enabling user power and limiting user power are critical considerations. Understanding these factors may contribute to increased user participation in media content production and distribution, which we argue is important in a democratic society. For this reason, the following sections discuss factors both enabling and limiting users' power to participate in media content production and distribution.

## *4. Factors Enabling User Power*

There are multiple factors enabling users to exercise power over content production and distribution. General consumer theories point to the increase in the power of users as they share opinions about products and when those opinions are heard by producers. In a media context, media users can share their opinions in two ways: their ability to select consumed content (through select-ability) and their ability to

participate in content production (through participatory media).

In moving from mindless consumption (e.g., of mass audiences) to mindful consumption, media users are gaining increasing power in the new media ecological system. In the process, we are witnessing media users actively forming alliances. Within these alliances, active users not only re-invigorate the 400-year-old 'public house' concept where anyone can generate conversations discussing any ongoing matters in society (Kovach and Rosenstiel, 2001), but some active users, such as those labelled 'pro-ams', also contribute heavily to content production with mainstream producers (Bruns, 2010). All this opinion sharing and knowledge creation increases the power of media users. In many cases the opinions of media users are making or breaking even the most established brands (Liu, 2012).

The ability to share opinions is not a new privilege for media users. It always has existed in many forms and formats. For example, users always have been able to contribute to media content through submitting letters to a newspaper editor or calling a talk radio program. However, in more recent times, we find that this ability to contribute content is growing. There are two major factors enabling this media user power: technological innovations and collaborative models.

## 4.1. Technological Innovations

We are in a digital age in which all forms of communication are digitalized. Media content in any format (e.g., television, music, movies and news) can be distributed over any geographical distance due to the Internet. With the development of mobile broadband technologies and always-on connectivity, media content is now more readily available. Thanks to these innovations, users have more opportunities to select media sources and content formats they would like to consume. Combined with the globalization of media, technological innovations enable international integration, which further reduces the gap between cultural discrimination and enables citizens from one nation to understand the media content of other nations.

Created by the interconnection of Internet nodes around the world, the Internet architecture is highly distributed, significantly facilitating the participation of users in media content production (Castells, 2007). This means that because content is not stored at any specific location (or node) on the Internet, user-contributed content very easily and quickly can be merged from one Internet node to another. At the same time, this means it also can be very difficult to be completely removed. Another advantage of technological innovations is that many tools are available to users to facilitate participation in media content production and distribution. For example, Web publishing tools help media users populate their contributed content across Internet nodes. Once this content is populated, it can reach large numbers of users (Chadwick, 2013).

## 4.2. Collaborative Models

Media producers are finding themselves in a critical situation in which their once-privileged positions are threatened by not just their competitors but also by the users they serve, especially as users take advantage of extensive collaborative opportunities. Media producer conglomeration is nothing compared to the power-enhancing potential of the massive Internet community (Kovach and Rosenstiel, 2001). While some media producers tackle this problem by using deploying policies restricting users' power, other media producers are grabbing collaborative opportunities with both hands.

In the collaborative model, active users (such as pro-ams) participate with mainstream producers to create media content (Bruns, 2010). This model not only brings diversity and depth into media content, it also results in a cost-efficient process. For example, pro-ams do not need to be experts or even knowledgeable in a wide range of subjects. Another advantage in this model is that pro-ams and media producers are able to incorporate and curate content without the need of face-to-face communication. Therefore, pro-ams can help media producers generate broad and highly informative content from anywhere in the world.

## 4.3. Factors Enabling Users' Ability to Select

Whilst it can be argued that some media users are active and have the power to control the content they wish to consume (Fiske, 1989b), others contend that media users also can be resistant, which means they can wilfully seek passivity (Barker and Brooks, 1998). In this chapter we argue, along with most theorists, that user power lies mostly in the user's ability to select content. Technological innovations, including the Internet and mobile broadband, not only give media users more choices in their selection of content, but also change media users' consumption behaviours.

First, users consume media content from a variety of media sources and formats and do not need to explicitly show their loyalty to a particular producer.

Second, users choose which subjects they want to consume (e.g., personalization and news-a-la-carte). Negroponte predicted back in 1995 that in the future online platforms would give users the ability to choose only the subjects and sources that interested them (Negroponte, 1995). Today, this prediction has been proved to be true. Users are able to customize the homepage of their news websites (e.g., Wall Street Journal, CNN, MSNBC, Washington Post, Fox News, Yahoo, Google News, etc.), list the most interesting topics, or specify which genres will be suggested in their video aggregation websites (e.g., HBO, Netflix, Viaplay, etc.).

Third, users consume media content recommended or 'liked' by friends. Through the availability of social networks, users today can form networks of friends. Media users tend to believe that the media content their virtual friends are interested in should be interesting to them as well. To the media distributor, the social network of

audiences holds great power. In the traditional broadcast era, beaming out content through transmission towers was adequate to secure audience attention. Nowadays, however, the media distributor needs to motivate media users to diffuse and distribute the content for them.

Finally, users consume different media content and formats at the same time (e.g., multitasking). For instance, users often validate news reported on television by seeking the same news on the Internet. Media producers face a critical situation if they ignore these user behaviour patterns.

## 4.4. Factors Enabling Users' Power to Participate

Participatory media enable participation of media users in content production. The central assumption behind participatory media is that the community is collectively intelligent. Massive user numbers, participating with each other, are able to provide independent, reliable, accurate, wide-ranging and relevant information that a democracy requires. With the growth of participatory media, the roles of media players seem to be converging. This phenomenon seems to be taking place from the top-down and from the bottom-up. In the top-down paradigm, active users (pro-ams) take significant roles in generating media content. In the bottom-up paradigm, massive numbers of users generate and distribute content amongst each other (mass self-communication).

Technological innovations and globalization both contribute to this transformation. First, online identity is defined by our contribution, not by our nationality, skin colour, wealth, education level or other characteristics that are invisible on the Internet. Because of this, anyone is welcome to participate and contribute. Second, the growing number of Web publishing platforms (e.g., blogs, photo/video sharing websites, podcast portals, community news, etc.) allows anyone with the right talent and energy the ability to be heard far and wide on the Internet. For those utilizing these platforms, a new type of media (i.e., participatory media) is emerging, where online communities discuss and extend content stories (e.g., news created by mainstream media producers). Sometimes, a massive online crowd reveals and discusses stories or ideas that have been ignored or filtered by mainstream media producers. The outcome of this trend is a diversified framing which gives media users different versions of one reality. Kovach and Rosenstiel (2001) argue that in this way participatory media supports a healthy democracy.

Even though Web publishing platforms (e.g., Slashdot, Indymedia, WikiNews, Youtube, Vimeo) contribute greatly to the growth of participatory media, many sociologists question the platform owners' objectives (Gustafsson, 2012; Shirky, 2008). This concern comes from the fact that the platform owners have full control over the content published there. For example, Apple controls the App Store, filtering out applications that might save users money on music and phone costs, but would diminish the profits of Apple's iTunes and telecom operators, such as AT&T.

Shirky (2008) suggests that the owners of Web publishing platforms should behave as gatewatchers, allowing platform users to self-organize themselves and to have utmost freedom to contribute. Interestingly, he contends that social networking sites that attempt to instil too many controls or requirements around users end up fading away as users abandon them. This result contradicts two common beliefs. The first is that that if media producers give over more content production and distribution control to users, it will result in lower quality content. The second belief is that if everyone is creating and managing content, it will result in a 'Tragedy of the Commons' problem (a theory proposed by American ecologist Garrett Hardin [1968]) in which multiple people acting in their own self-interest will eventually destroy the resource. However, Shirky asserts that this situation can be avoided through the collective self-policing process of a media site: "The order of things in broadcast is 'filter, and then publish'. The order in communities is 'publish, and then filter'. When the community grows to a certain size, many highly intellectual users will eventually be nominated by the community to take the editor roles. These nominated editors will keep track of the quality of the content" (Shirky, 2003). Shirky also suggests that mainstream media producers should apply the same policy. Instead of controlling the flood of information across multiple channels, media producers should keep track of all this through loosely organized efforts. In this way, media producers should switch from their traditional agenda-setting roles to agenda-building roles in collaboration with users.

# 5. *Factors Limiting User Power*

Whether we like it or not, media users today face limitations in their options to choose, access and participate in creating media content. Understanding these limiting factors in the context of individuals' media usage, be it through participation or mere consumption, will provide us with ingredients to further investigate the shades in the power struggle between media producers and users. In this chapter we do not attempt to offer an exhaustive list of these limitations. In fact, our analysis does not cover, for instance, the wide-ranging, ongoing debates on copyrights and regulatory frameworks such as EU Consumer Data Protection. Indeed, the Internet's impact on societal change has been said to culminate around access to the Internet, privacy and intellectual property (DiMaggio, Hargittai, Neuman and Robinson, 2001), and it is largely the question of access to Internet and privacy that we have chosen to investigate here.

## 5.1. Factors Limiting Users' Ability to Select

First, we begin with a discussion on factors potentially affecting users' ability to select media content, as this has a bearing on users' power over the production and distribution of media content. A user's ability to actively select media content may be

influenced by factors such as the so-called 'digital divide', search engines' customization capabilities and censorship practices.

### 5.1.1. The Digital Divide Affects User Power

It is argued that an information society does not necessarily equal an informed society (Selwyn, 2004:257; Introna and Nissenbaum, 2000). The term 'digital divide' initially was coined to describe the inequality of people's access to knowledge-gaining devices such as telephones, computers and the connecting network infrastructure, and, later, the quality and speed of those connections. Put simply, the digital divide describes the divergence between those who *have* access to knowledge versus those who *have not.* The UN Millenium Development Goals in 2000 set targets to decrease the number of those who do not have physical access (United Nations, 2013).

Van Dijk and Hacker (2003) suggest we look at access from the perspective of an iterative four-step process beginning with motivational access as the first step. This first phase of motivational access involves the user's social, cultural or psychological background. Pro-ams (professional amateurs who tend to be more motivated to participate than, for example, passive users) move quickly from this initial phase to the next. The second phase is the user's material access, such as income and education, which affects the user's ability to have a computer and Internet connection. The third skills access phase involves operational, informative and strategic knowledge of the use application. For example, a person might have an application such as Adobe Photoshop available but s/he may not know how to use it to produce and publish quality pictures online. A person might have a Twitter account but does not how to use it actively and effectively. The final usage access phase is the stage in which a person actually uses the application, even though s/he may still remain passive (Van Dijk and Hacker, 2003). Van Dijk and Hacker argue that it is this final usage access phase that seems to be building a larger gap between users today. On the other hand, we agree with Haramban et al. (2013) who emphasize the first phase as the problematic phase in this process, namely that motivation (see earlier section in this chapter) is vital in understanding the digital divide today.

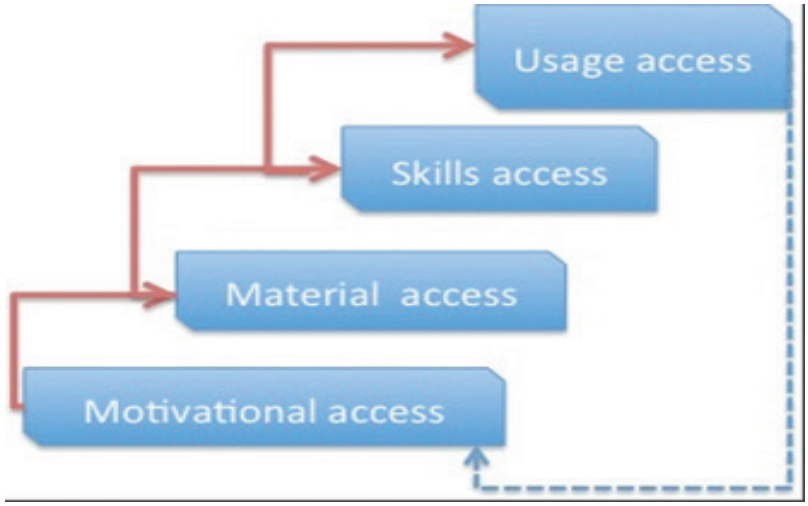


**Fig. 3.** ***Dimensions of Access in Defining the Digital Divide (Van Dijk and Hacker, 2003:315-316, adapted as in Ghobadi and Ghobadi, 2013)***

According to Selwyn (2004), the digital divide inevitably has transitioned from a comparison between countries to divisions within countries. In addressing this gap, he proposes that the focus should be on the content that access gives users, rather than on the technologies being used. Selwyn suggests that a better understanding of the impacts or consequences of using ICT (information communication technology) can be avoided by the term 'meaningful engagement with ICT' through examining users' participation in activities such as production, political, social, consumption and savings activities in society (Selwyn, 2004:350–351). In essence, Selwyn calls for extending our understanding of the digital divide as part of a larger discourse on social inclusion in societies. Some researchers argue that societal structures, including asymmetrical power relationships, may have been replicated to the Internet, preventing societal development progressing (Castells, 2009; Introna and Nissenbaum, 2000).

Debates centred around increasing social inequalities raise concerns about whether equitable access to media leads to an equitable information society. It is believed that societal structures either impede or encourage the use of media. Through the roll-out and provision of new technologies, for example, some societies may leapfrog older technologies providing citizens with increased access to media content. As an example, some nations experience high mobile phone penetration compensating for low numbers of fixed phone lines. Interestingly, according to a 2012 Semiocast commercial study heavily populated countries such as Brazil and Indonesia are among the most popular Twitter locations, with Jakarta leading Tokyo and New York in terms of frequency of tweets sent by cities (Semiocast, 2012).

Whilst socio-economic aspects such as age, education and users' income affect the digital divide, another key influence is motivation to seek information and to actively participate in content production and distribution (e.g., Straubhaar, LaRose and Davenport, 2013:438).

### 5.1.2. Censorship and Customization

Censorship is another obvious factor limiting users' ability to select media content. One way to exclude the views of those not sanctioned by governments or mainstream media, such as bloggers and vloggers, whether pro-am or not, is through censorship – the various selection-limiting practices imposed by government agencies and Internet service providers (ISPs). MacKinnon (2008) examined how the Chinese blogosphere has enabled social change in China to slowly evolve and the practices the Chinese government use to manage this digital discourse space. For instance, private service providers also practice a form of self-censorship in scanning, monitoring and censoring content. Users' selection power therefore might remain limited, if only a small proportion have the skills and technology to bypass these barriers (MacKinnon 2008; Ghobadi and Ghobadi 2013).

Another more subtle way of limiting possibility to select media content is through customization. While media producers have traditionally selected the content offered to the users, today search engines do such selection automatically. This is enhanced by the increasing maturity of the options for providing hits to users seeking information based on rankings such as popularity or recommendations or simply on users' online behaviour (see Bucher, 2012). When Introna and Nissenbaum (2000:181) called for transparent disclosure of the practices used to formulate search engines' algorithms including rules for searching, indexing and prioritizing, these search engines were still in their infancy compared to their capabilities today (see Hyppönen, 2013). This may limit the users' power to select desired content when content is not even visible to choose from.

## 5.2. Factors Limiting Users' Power to Participate

In this section we consider some possible factors limiting users' power to participate in content production and distribution. We begin with the issue of privacy, which is increasingly becoming a major concern for users worldwide. This section also discusses users' willingness to share information, as well as government influences restricting users' power to participate.

### 5.2.1. Privacy

Each time we access any digital communication device or network we leave behind information about ourselves that makes it possible for others to identify who we are, where we are, and who we are with. Our Internet journeys leave behind 'digital trails' and make it possible for others (e.g., corporations) to evaluate, for instance, our opinions, values, interests and preferences. Such information also may help corporations

to create better user experiences and to forecast what might be our next purchasing steps, either in the virtual or real world (such as travel, hotel and restaurant bookings, as well as tax and healthcare payments). These various information types are called a 'trail to our digital identities' (Tuppen, 2013).

Discussion on information privacy aims to answer questions on who, what and to what extent others should have access to our digital trails wherever and when those trails might be generated (Nissenbaum, 2004; Preibusch, 2013; Son and Kim, 2008; Tavani, 2007). These digital trails are visible and accessible to actors with knowledge to interpret them for various purposes, such as commercial, governmental or simply for service providers to understand better and respond to users' needs while using the services. Users easily tick the privacy agreements or accept cookies without reading lengthy underlying texts in order to have the application or service work or maybe sometimes even without the possibility to consent to the topic at all (e.g., BBC, 2013). By accepting such conditions, the user may give corporations the right to re-use and sell his/her information to other actors who in turn might sell the information further. Arsenault and Castells (2008:248) labelled this recently emerged new concept as 'commodification of digital identities'.

Responses to these concerns over privacy losses have been debated and discussed a great deal. For instance, Son and Kim (2008) proposed a taxonomy to better understand various responses that users have, namely information provision (misrepresentation or refusal), private actions (negative word-of-mouth or removal of information) or public actions (complaints).

Interestingly, Hargittai and Litt (2013) found that educated young women seem to change their privacy settings more than people of other demographics in order to manage their online histories, especially in an aspiration for potential employment. However, successfully hiding or erasing private information online may be far too difficult with today's technology. Mikko Hyppönen from F-Secure claims that our only approach now is to accept the reality that "privacy is dead" (YLE, 2013). Today it is assumed to be cheaper to gather new data on users for potential future use than delete user data from databases (YLE, 2013). Intense debate over customer data protection is ongoing, for instance, at an EU level.

### 5.2.2. Willingness to Share

Another factor that potentially limits users' power to participate is users' willingness and ability to share personal information online. Users are increasingly living out their lives in their social media worlds, sharing their events, thoughts and opinions, as well as their future intentions. But how willing are they to actually share their most intimate private information or their online browsing behaviour? A 2010 study found that 63 percent of Internet users feel concerned that their Web privacy is being compromised (Wills and Zeljkovic, 2011).

For some users, such as bloggers participating in societal and political debates, sharing information online has affected their livelihood in dramatic ways. Accord-

ing to the journalism organization Reporters Without Borders (2013) the amount of netizens and citizen journalists (mainly from Syria) killed in 2012 amounted to forty-nine. By November 5, 2013, the number of imprisoned netizens and citizen journalists totalled 157 from fourteen countries, while twenty-eight were reported to have lost their lives in 2013. Users' willingness to share personal information and online behaviour, combined with the capability of today's technology to capture and report users' online data, can be argued to be a limiting factor in users' ability to participate in media activities.

### 5.2.3. Governmental Interference

Governmental interference also may hinder users' participation in media. Information technologies enable government agencies to intervene in online media content production and distribution considered undesirable. Nissenbaum (1998, 2004) discusses how information technologies have altered our understanding of what constitutes our private spheres or our 'privacy in public' places, for instance in the context of potential governmental invasions of privacy. Nissenbaum proposes a concept of contextual integrity to highlight that users of information should consider its normative appropriateness and distribution flows to determine whether it would violate a user's privacy, albeit collected from the new digital space.

Our rapidly increasing understanding and experience of the potential infringement of an individual's human rights such as freedom of expression and privacy has generated intense public debate. Both industry and regulatory bodies are attempting to address these multi-faceted challenges to which regulatory frameworks do not yet provide clear answers. Endorsement of UN Guiding Principles on Business and Human Rights by the UN Human Rights Council in 2011 also have intensified the debate of human rights in the context of information technologies (Tuppen, 2013). The UN Guiding Principles revolve around the need for states to protect, business to respect and citizens to have access to remedy any human rights violations (Business & Human Rights Centre, 2013).

Governments have the capacity to access users' information through examining their past digital trails or trails being created (in real time) in order to ensure national security, to prevent serious crime or to secure national commercial interests (Tuppen, 2013). In many countries these are considered 'justified reasons' (Moor, 1997). Governments may request communications providers to switch off access completely for either targeted or mass users. Alternatively, they may request interception of the communication of targeted or mass users either historically or in real time (Tuppen, 2013). Examples of switching off access include closing down sites for netizen journalists, blocking access to sites containing restricted words or images, or simply shutting down entire networks (such as the experience in Egypt during the Arab Spring in 2011). Ongoing revelations since the Snowden case in 2013 are further examples of these possibilities to intercept in practice (Hyppönen, 2013) and demonstrates how participation might be limited.

# 6. *Interviews: Predictions and Future Perspectives of Power*

To support the literature review and in order to contextualize the phenomenon (of blurring media producer and consumer roles), we undertook ten semi-structured interviews with people working in different fields of media (i.e., public TV broadcast, film, press photography, media agency, newspapers, academy and digital media). Interviewees were selected based on their level of knowledge, experience and practice in the media, and based on our expectation that they each would be able to offer insight into the future of media. Some are considered professional media producers, others pro-ams, and still others would position themselves strictly on the side of users. (See Appendix 1 for more details.) The statements they provided further deepened our understanding of the staggering speed of change this sector is experiencing. Our conclusions therefore are founded on both the literature review and these interviews.

We used judgemental convenience sampling in our qualitative research approach. We conducted our discussions with the ten different media experts using an open-ended questionnaire as an indicative interview guideline. These discussions took place during October and November 2013, and they each lasted between thirty minutes and one hour. The interviews were conducted either by phone, email, Skype or face-to-face. Due to the small sample size and varying interview techniques used, we have chosen not to append full interviews to this chapter. Instead, we have inserted portions of interviewees' statements into this concluding section in order to support our own arguments.

As a result of our literature review and expert interviews, we have identified five key areas offering great potential for innovation and growth in the future: power, money, curating, participation and technology. Here we discuss each of these five areas and offer predictions and perspectives that we hope will be of interest to media players as they attempt to navigate the media world over the coming years.

## 6.1. Power

Looking towards the future, the power of users will continue to increase while the power of media producers (professionals) will continue to decrease (Fig. 4). In fact, the influence of media producers may even become 'obsolete' in some areas such as photography. Finnish sports photographer Kari Kuukka (interviewed for this paper) estimates that he will be doing his last 'press shootings' in just a few years' time. He anticipates that in areas like music or sports in which masses of people are passionate, there will always be eager pro-ams photographers or amateur photographers who will be willing to take photographs (such as of concerts and competitions) for a much lower cost than professional photographers.

Media players' roles will polarize. On the one hand, there will be fewer professional media producers, and the only ones left will be extreme experts in their field provid-

ing top-quality material, almost resembling artwork, as well as valuable personal insight. Their names will be well known to their many fans. These producers, although they might be fewer in numbers, will possess a high level of power over users. On the other hand, the bulk of the everyday content consumed by users in the future will be produced either automatically by software or by amateur users. The number of these content-producing users will dwarf those of the remaining professional producers, and in this sense their power will be maximal.

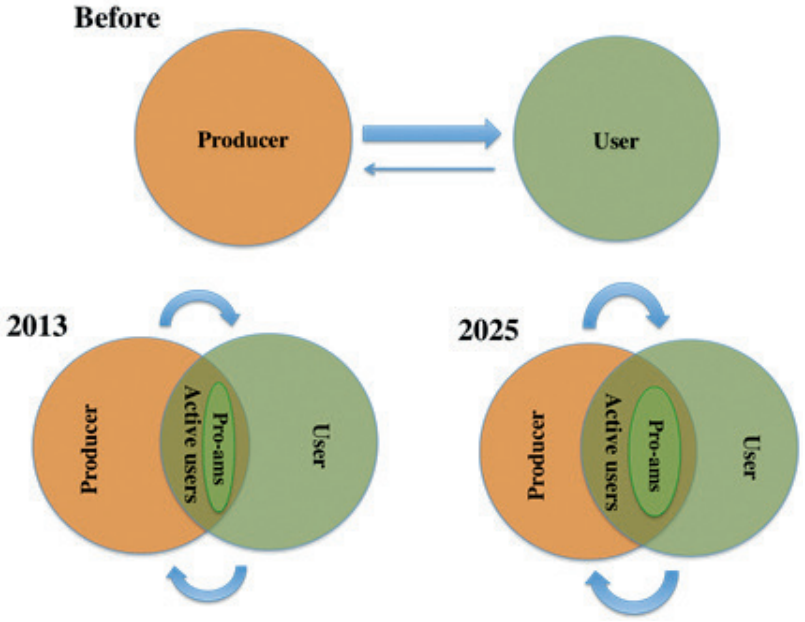


**Fig. 4.** ***Power Transition***

In the future, production by professional producers will be more about curating, managing and presenting user-sourced content, as well as managing user communities. These professionals will be needed in order to cover topics that are important but not necessarily popular amongst amateurs. They will be needed to provide what Anne Söderlund (interviewed for this paper), regional producer at Yle Nyheter (YLE TV Swedish News), calls 'perspective'; that is, a neutral, objective and professional approach in topics such as politics or environmental affairs. She states: "The major role for media producers will be to sort, to put in perspective, to give background to, and to present different points of views."

As knowledge and experience in media production practices are rising globally, the participation of users in content production, distribution, curating and funding will be present in all sectors of the media landscape. It is intrinsic to the content production value chain that users, producers and media owners are dependent on each other.

As recent platform acquisitions demonstrate, such as Instagram by Facebook and Tumblr by Yahoo in 2013, media companies today are valued mostly for their user

database (e.g., for marketing purposes). One direct effect of valuing access to user data more than the content they produce is that Internet companies now are getting most of the revenue, even though they do not create any of the content themselves. They have become media companies from another industry, and we expect such a paradigm to continue to occur into the future.

## 6.2. Money

Currently, most online media production is funded by advertising revenue. This advertising-funded content production has the disadvantage of incentivizing the production of so-called 'viral content' that requires only a short attention span but has a wide reach and is therefore an ideal carrier for advertising messages. Revenue based on clicks and unique users has already transformed the way a lot of content is produced online, giving quantity and novelty bigger revenue than quality or user appreciation.

Looking to the future, as nearly all media content is distributed over the Internet, the question being asked by both producers and users is: How can we make money from this? Alternative funding schemes are a top priority for anyone working in media these days, and one of the more successful ideas at the moment is getting users to pay for content production upfront. The crowd-funding message, that if the funding goal is not reached the content will not be produced, adds a strong incentive for users to contribute funds. Indeed, it also allows users to actively contribute to the content production and participate as though they are a part of it.

Satu Puumala from media agency Dagmar (interviewed for this chapter) stated that today the customer is the media. In other words, money flows from the power of users' recommendations regarding products and services. Indeed, recommendations from well-respected pro-ams are worth money. These recommendations directly impact the decisions made. Corporations and professional media producers should acknowledge and deal with this trend and attempt to tap into this valuable, money-generating group of pro-ams.

## 6.3. Participation

As users increasingly take advantage of the Internet to interact and even collaborate with content producers, participation will become one of the most important aspects of online content distribution. Being able to discuss, remix and otherwise interact with content on the Web gives participation an added value. Clearly, participation in content production and distribution will become the status quo in the future.

Some professional media producers are even attributing the last rise of TV drama (i.e., Breaking Bad and Game of Thrones) to the participation of viewers in sharing their viewing experience via social media platforms such as Twitter. Thanks to ongoing technological developments, participation will move to a whole new level; users will be able to experience any event anywhere on the planet as though they are there.

Finnish filmmaker, Milla Moilanen (interviewed for this chapter), stated that film productions already are taking advantage of participation with their audiences and that this practice will increase in the future: "Audiences are being asked to participate, for example by providing tips and ideas through social media. In this way audiences are providing valuable material in an economic way."

Professor Greg Lowe, Professor of Media Management at Tampere University and President of the European Media Management Association (interviewed for this chapter), believes that increasingly media producers will need to adopt more humility if they are to survive. "They will need an attitude of partnership and collaboration with users, as well as with other actors such as other media organisations," he stated.

Erkki Hujanen (interviewed for this chapter), news editor of the Oulu newspaper Kaleva, agrees. "Newsrooms have been a bit self-complacent in their practices, thinking that they know best," he stated. "Competition is getting tougher and many (media outlets) have difficulties in reaching younger readers. There has been a certain culture of journalists 'speaking past' their audience, journalists not addressing their audience. This needs to change." In other words, media producers (i.e., journalists) in the future will need to develop an appreciation of the value of participation with their users.

Janne Kaijärvi (interviewed for this chapter), chief media officer at Leia Media, believes increased participation will lead to better quality content: "Journalism will inevitably become better when more people are involved in the making."

## 6.4. Curating/rating Content

As media production moves more towards becoming a common user activity than an exclusive, professional field, one side effect will be that huge volumes of content will be produced. A negative consequence of this is that some high quality productions may be drowned out by a swarm of mediocre and repetitive content. Giving users a way to find relevant, high quality content will become increasingly challenging in the future.

While some platforms are leaning more towards user-based rating systems, others trust algorithms such as recommendation engines – or a combination of both. A solution for individual content relevance assessment without the creation of hermetically sealed-off user bubbles would most likely help content production and usage immensely.

## 6.5. Technology

Whilst technology will continue to be an obvious major driver of increasing user-generated content, it is the second-order impact of technological innovations that will be even harder to predict. Here we discuss some areas of interest that likely will

have a huge impact on the media landscape in the future. When photos and online video become more searchable in the near future, finding relevant visual content will become much easier than it is today, and this likely will lead to a rise in video consumption. Similarly as translation technologies advance, and as languages begin to be translated automatically in real time, these technological innovations likely will also make content more accessible to more people around the globe. This also will open the door for new producers from small language areas like Finland.

One of the most crucial technological changes will come when software will understand natural language input, before other sensory inputs such as eye movements will be available. As human computer interfaces become more natural, it will make our interaction over the Web more seamless. It will also counter the 'digital divide' as the interaction between content and people over the Web will become less obstructed and more effortless.

## 7. Conclusions

We have seen massive changes in the media over the last twenty years, owed largely to digitalisation, which has made distribution costs come close to zero. However, there are no free lunches either. As Lauri Kivinen, CEO of YLE, stated recently, "Someone always needs to pay for the content in one way or another" (Kivinen, 2013). Together with steadily dropping production costs, this has led to a global rise in media content production, as exemplified by the rising amount of content being produced. Many new players have entered the production landscape, and, even though many of the old players are still around, their days of stable growth are over.

Today, media users are increasing in numbers and increasingly are collaborating amongst themselves and with professional producers. They are making more use of growing numbers of participatory media platforms and generally have a bigger choice of media content and platforms in which to consume this content. Given all this, their individual and collective power over media content and media producers themselves is growing exponentially.

Before all this began taking shape, skills for media production were mastered by only a relatively small group of experts. However, today these skills are becoming a normal part of our basic skill set, and more and more people are expected to master them. Indeed, these skills increasingly are being taught in elementary schools (e.g., shooting and distributing videos). Anyone can become a medium, producing and broadcasting content on different platforms. For companies, this presents a unique opportunity to have fast and direct access to clients and customers without the (once high) cost and mediating role of delivery media, the traditional media institutions such as television or print production.

With better access to tools, knowledge and distribution channels, a new group of entrepreneurs has emerged. These pro-ams, who often have no formal training

in media production but are passionate about their subject matter, have managed to gain more and more influence in recent years. Their influence can be seen in the emergence of more diverse content and formats, but also as they invoke general changes in production practices, as they are effortlessly involving their fan base in their production and funding processes as well as openly sharing their knowledge.

All these changes create tension and power plays amongst media players, such as through ongoing, unresolved debates on censorship, privacy, piracy, control over content and so on. But these changes also offer great opportunities for entrepreneurs (i.e., pro-ams) to fill the void where traditional producers do not yet dare to tread. They also give hope to professional media producers, for we assert that more power to the people may, in actuality, lead to more power to media producers who are prepared to adapt to the changing times.

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# *Appendix 1: List of Expert Interviews*

| Name | Title | When, How |
|---|---|---|
| Erkki Hujanen | News editor, community, Kaleva | Nov 05, 2013, *by phone* |
| Janne Kaijärvi | Media fficer, Leia Media | Nov 07, 2013, *by phone* |
| Kari Kuukka | Freelance photographer and multimedia producer | Nov 14, 2013, *face-to-face* |
| Matti Lintulahti | Partner and content strategist, Kubo | Nov 15, 2013, *by phone* |
| Greg Lowe | Professor of Media Management, Tampere University, President of the European Media Management Association | Nov 11, 2013, *by Skype* |
| Derek Muller | Pro-am vlogger (Veritasium) | Nov 10, 2013, *by Skype* |
| Milla Moilanen | Film maker | Nov 12, 2013, *by phone* |
| Satu Puumala | Client director, Dagmar | Nov 01, 2013, *face-to-face* |
| Anne Söderlund | Regional producer, Yle Nyheter (YLE TV Swedish News) | Nov 11, 2013, *by email* |
| Dinh Thi Quynh Trang | Pro-am vblogger and blogger for travels | Nov 10, 2013, *by Skype* |

# When Media Companies Move to the Cloud: What Happens to End-users if They Lose Control over Their Personal Data?

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**Abstract.** Today media consumption plays an important role in our daily life; cloud computing especially is on the way to making it possible for us, the end-users, to access media from anywhere at anytime through various digital devices. To create sustainable business models, media companies new and old strive to meet the needs of consumers by providing adequate services and compatible products. Applying cloud computing, media businesses and end-users as well, face new challenges in terms of

data security, privacy and sovereignty, meanwhile enjoying the advantages of cloud computing, such as convenience, efficiency and economics.

Under this changing media landscape due to innovative digital communication technology, the role of end-users has turned from being passive to active as they are allowed to co-create, co-share, co-consume the media content. Traditionally, it was exclusively professionals who would compose the media content to be distributed by media companies such as newspaper, radio, and television. Now, with the mobile cloud media service providers, end-users become content providers as well. New media companies are more interactive and responsive in nature, and that has triggered the transformation of traditional media as well.

In this research, we study the transition of media companies from traditional ways of operation to new business models compelled by cloud computing. As end-users' media consuming behaviours are the decisive factors for media companies to develop new types of services and products, we have further designed three personas and four future scenarios to illustrate the possible development of the media industry. The foundation is seven case studies of current media companies from traditional television to the latest mobile social media.

**Keywords:** cloud computing, media, end-user

# 1. Introduction

Communication technologies have influenced the development of modern societies profoundly. Printing, Internet and, most recently, cloud computing are three revolutionary innovations that to, a certain degree, have reshaped human civilizations in terms of economic system, social structure, and national and international politics. Ever since the booming of personal computers, human beings have become more and more connected, literally and symbolically, through local and global digital networks based on the Internet. McLuhan (1964) proclaimed already half a century ago that the "medium is the message". That has precluded how technology would define our way of life and thinking. The digital communication technologies seem to evolve at such a speed that it is almost impossible to understand thoroughly their impacts on our societies, and current communication theories are not applicable to the digital context. Under the current digital network reform of cloud computing, this study attempts to find out: *When media companies move to the cloud, what happens to end-users if they lose control of their personal data?*

In the literature review we approach the research question from three dimensions – media, cloud computing, and the end-user. Starting from basic definitions to current states under the influences of digital technologies, we have depicted a map to reveal (1) the media landscape reshaped under time, (2) how cloud computing compels media companies to apply the new technology, and (3) the changing role of the end-user from traditional mass media to the current social media.

The traditional **media industry** containing press, radio, and television are taking up new platforms based on information communication technologies. Social media and mobile devices enabled by the Internet and cloud computing are bringing new territories and challenges to the media industry, which is under transformation in service products, ways of operation and business models. **Cloud computing**, being the main trend of current computing industry, is thoroughly changing the way we work, entertain and live, as well as the way media companies provide their services. It significantly expands the quantity of media content stored remotely under an always-connected Internet ecosystem enabling the **end-users** to access from anywhere at anytime. It also increases the efficiency and reduces the costs of management and operations of the media companies. However, the issues of data security, privacy and sovereignty are still problematic for the end-users. Although some end-users are reluctant to move to the cloud, their behaviours become the key factors for media companies to develop their business models based on cloud computing.

For the purpose of demonstrate our studies on the future scenarios of cloud media service providers, we have established three personas: **Franck** the restrained, **Emma** the entertainment seeking, and **Hank** the highly connected to represent three types of end-user behaviours according to Kilian, Hennigs and Langner's (2012) three sub-groups of millennial media consumers. The main argument is that media companies need to develop their practices and products to meet the needs of all these end-user

types. These three personas would behave differently in their consumption of media. Geographically we focus on northern Europe and the United States only.

By seven case studies on current media service providers, we have constructed the playground or stage for these three personas. They are **Twitter, Spotify, NBC, Sonera Entertainment (Sonera Viihde), YouTube, iCloud** and **WeChat**. In order to gain insights on how cloud computing affects these media companies and their end-users, we briefly investigate their various products and business operations via their websites and/or mobile applications. Ranging from a traditional media company (NBC), to telecommunication operators running media businesses such as Sonera, to most recent mobile social media service like WeChat and Twitter, these case studies drawn from a global scale depicted thoroughly the current digital media landscape. Furthering the studies, we went on to analyze the companies' legal documents respectively with regards to their terms and user agreements, and their website performances and mobile applications provided by them. Accordingly we described the media consumption habits of these three personas within the framework of these case studies. The framework is simplified in Fig. 1.

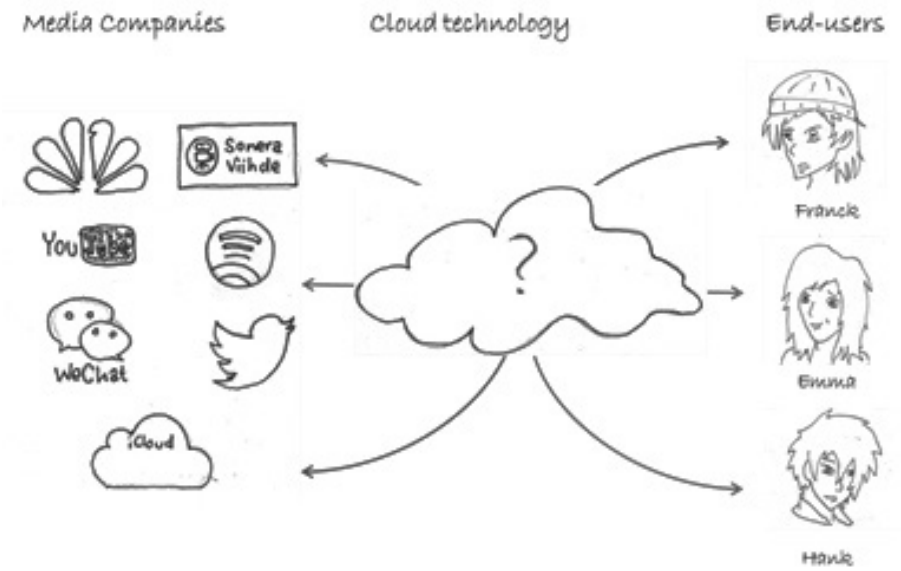



**Fig. 1.** ***Playground of the Study***

As the focus of this research is to underline the impacts of cloud media service providers on end-users, we have composed four future scenarios in the end to illustrate the results of our study. (1) **Automatized media services:** The economical drivers compel media companies to provide exclusively personalized and automatized services which lead to diminishing product varieties that rely on subscription-based revenue models only. (2) **Cooperation and open policies:** The legislative drivers lead the media industry to update and standardize its policies and user agreements

due to increasing data security incidents and information leaks with the result that governments worldwide have started to cooperate and enforce new laws to govern digital media. (3) **A fair information world led by pro-amateur end-users:** The socio-cultural drivers encourage end-users to react to the technology-dominated media businesses and to build a rather fair 'glocalized' information society with less concerns to be abused or exploited by any gigantic information businesses. (4) **The collapse of the Eastern Information Wall:** The information availability drivers succeed in crashing the Information Wall between the West and China and enabling free communications, transcontinental and transnational, through the Internet. Consequently, in each scenario we also note the potential threats that are followed by recommendations.

# *2. State of the Art: Media, Cloud Computing and End-user*

## 2.1. Media Landscape Reshaped

According to the Oxford Dictionary, 'media' is defined as the main means of mass communication: television, radio, newspaper, book, magazine, etc. The emergence of new technologies in the past, namely printing and the Internet, have revolutionized the traditional media industry thoroughly. Now, cloud computing is bringing another complete transformation.

As the information era has enabled market segmentation, the Internet era has enabled mass-customization with social media (Kilian et al., 2012). Altogether, the Internet, social media and cloud computing have altered the mass communication of traditional media by increasing the interaction between the media and the end-users, changing the roles of and relationships among different media stakeholders, and enabling the locational data spread.

Notably social media has turned traditional media from passive to responsive. In fact, the rise of social media has lead to the Internet going back to its initial purpose: a platform that facilitates information exchange between its users. By definition, social media indicates "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0 to allow the creation and exchange of user-generated content" (Kaplan and Haenlein, 2010).

Ever since it's emergence, social media has fundamentally modified the distribution of media and its business models by changing the way of communication from one-to-many to many-to-many. It has made active users become co-producers by sharing their media content among themselves (Kilian et al., 2012). This change of media users' behaviour has redefined the business practices of media companies. Thus, Berman, Abraham, Battino, Shipnuck and Neus (2007) have predicted four potential business models for the future media industry: traditional, walled commu-

nities, content hyper-syndication and new platform aggregation. Their prediction on these segmented markets has come true today.

Besides, the mobile technology has expanded social media's realm with features such as collection of location data as well as individual message delivery (Kaplan, 2012). The mobile social cloud computing paradigm has allowed end-users to co-produce, co-share and co-consume media contents at any time and from anywhere.

The aforementioned issues have illustrated our understanding of media in this article. That is, it not only consists of the traditional mass media (newspaper, radio, TV, etc.), but also contains a social-creational element enabled by the Internet, cloud computing and social media. The one-to-many communication model consequently becomes many-to-many. Before, it was professionals distributing media content to consumers. Now consumers, i.e., end-users, can utilize the provided platforms to co-produce, co-share and co-consume media (Berman et al., 2007).

## 2.2. New and Old Media Businesses Moving to the Cloud

It is known now that after the Internet, the phenomenon of cloud computing is transforming traditional media companies (Dihai, Bouwman, de Reuver, Warnier and Carlsson, 2013) and is bringing new forms of media services into the light. The former old media businesses include television broadcasting, radio, newspapers, publishing houses and the music industry; the latter new ones contain telecom operators, the game industry, mobile media and so on. As media are evolving all the time with new technologies, cloud computing is the latest catalysis as it offers novel and efficient solutions for media service providers in content storage, streaming, market data collection and specified mass-customization. The roles and the power structure among various media stakeholders fluctuate because cloud computing makes media accessible without limitations in terms of time, space and/or device.

What is this powerful cloud computing then? Being the latest computing paradigm (Buyya, Yeo and Venugopal, 2008), it has dozens of definitions. One of the most cited is from the U.S. National Institute of Standards and Technology (NIST, 2011):

> *Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.*

This definition comes from the classification of cloud services in three levels. (1) Infrastucture as a Service (IaaS): Providers offer access to servers for users to perform their computing tasks in running a program or a service. This model does not necessarily include Operating Systems. (2) Platform as a Service (PaaS): Providers offer a platform for users to develop and run their own programs and software. (3) Software as a Service (SaaS): Providers offer the whole software as one service (National Insti-

tute of Standards and Technology, 2011).

The growth rates of cloud services in various sectors are high, according to Lurcott (2013). By 2014, 60 percent of server workload will be virtualized and more businesses will employ cloud services. Already, 40 percent of the customer relationship management (CRM) systems sold globally are cloud-based. About 50 percent of the revenues from cloud computing revenues are from the United States. The media industry is no exception. As cloud computing provides efficient and economic ways for content distribution, media companies start to offer their cloud-based services through cloud service providers. We hereby added to the NIST three levels with the (4) cloud service level as Media as a Service (MaaS). The layered nature of cloud computing is illustrated in Fig. 2.

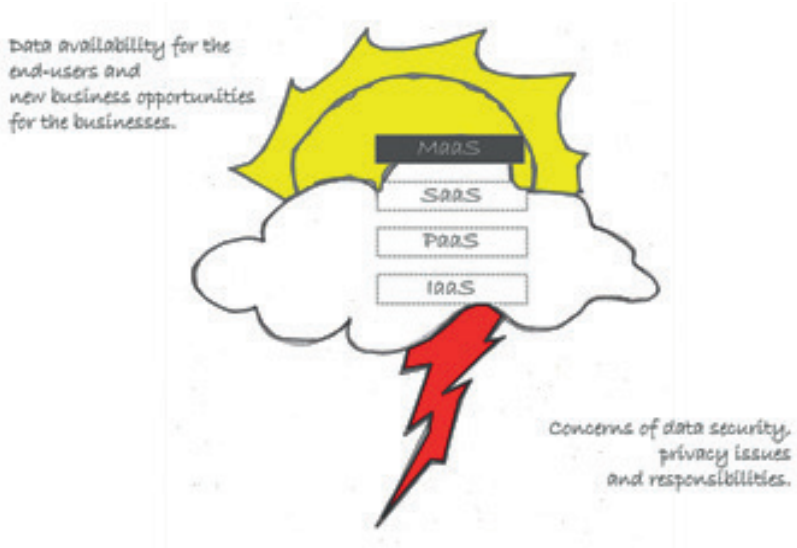



**Fig. 2.** ***Media as a Service: Media can be considered as a fourth service level in a cloud-computing scheme.***

In traditional media, television companies like BBC have provided free online streaming of selected series and shows (Hunter, 2012). Some of the operator companies also employ cloud computing actively; for example, Virgin Media (UK operator) has used cloud computing to upgrade their services and improve the customer experience (Williams, 2011). Consequently, they have recognized the potential to adopt cloud-based publishing technologies (Hill, 2012). In addition, the music industry is the pioneer in expanding business with cloud computing. Since the beginning of the twenty-first century, end-users have been able to store and record their music files in the cloud (Straubhaar, LaRose and Davenport, 2010).

Although there are solid reasons for media companies to apply cloud computing, "the factors that make the cloud model appealing – the enormous bandwidth and storage capacity consumed by video – is also holding it back" (Hunter, 2012). Data

privacy and the legal terms and agreements suggested by cloud service providers are major concerns (Bender, 2012). Besides, the current costs of Internet bandwidth make it unprofitable, and, therefore, a complete migration to the cloud is yet to be realized (Hunter, 2012). The room to develop new business models with sustainability remains vast, though exist already a few with small scale based on inserting banner advertisements into video streams according to collected data as the end-users' preferences. (Hill, 2012).

## 2.3. The Changing Role of End-users

The term 'end-user' originated from two fields: economics and computer science. In economics, 'end-user' indicates an actor who ultimately uses the product on a legal and commercial basis. In computer science, it is based on the idea that the end-goal of a software or hardware product is to be useful to the end-user (Laudon and Laudon, 2011). The term signifies that a software program or hardware device is designed for the end-user either technically or socially. End-users also are in a separate group from the installers or administrators of the product. However, this demarcation is becoming blurred with innovative end-user computing (McBride, 2007), open source, crowdsourcing and social media.

As described previously, media companies new and old are moving to the cloud for economic reasons. Being media consumers, most of us are already in the cloud whether we know it or not (Devry University, 2013). We are in the cloud when we upload a video on YouTube; store our photographs to Flickr; post them on Facebook; collaborate a project through Dropbox; create documents, spreadsheets, presentations in Google Drive; and so forth. According to a study done by Devry University, 95 percent of people have used the cloud without knowing it, 54 percent claim they have never used the cloud, and only 16 percent correctly think the cloud is a place to access, store, and share data. The study predicts as well that by 2016 a billion users will be utilizing the cloud. Actually Gmail already has more than 425 million users, iCloud over 150 million, and Dropbox over 50 million. These numbers demonstrate the popularity of and the definite shift toward the cloud in the context of media consumption.

However, despite the novel business opportunities for media service companies and cloud service providers, cloud computing has its drawbacks. As mentioned at the end of 2.2, end-users might not be aware of where their media services are run or who operates the platform while they are enjoying the convenience brought by cloud computing to access media from anywhere at anytime (Devry University, 2013). Data privacy is the core issue here.

Currently (a) end-users, (b) media companies and (c) cloud service providers are attached to the cloud media business. At least two legal terms and agreements exist between (a) and (b), and (b) and (c). In most cases, end-users are not aware of the second one. Although most cloud service providers acknowledge the concerns of end-

users regarding data security, privacy and sovereignty, they do not suggest concrete solutions, either technically or legally. We will discuss this issue further in 4.2.1 with our case studies.

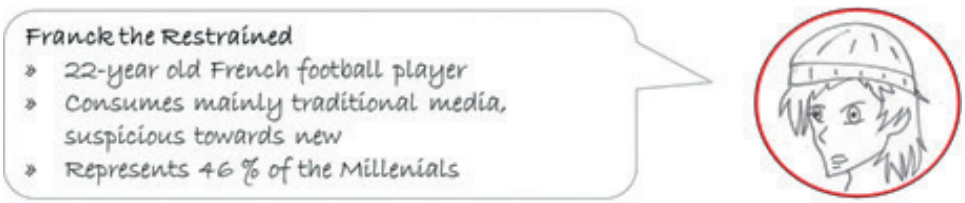
Theoretically, it seems that there are ways to tackle the problem; for example, Trappler (2010) has tried to offer pragmatic suggestions on four points of view: (1) service level agreements (SLAs), (2) data processing and storage, (3) infrastructure and security and (4) vendor relationships. In addition, as more and more governments employ cloud computing (Wyld, 2009), it becomes urgent to resolve legal issues and market regulations in terms of the scalability, reliably, data security, open standard and interoperability of cloud computing.

Together with the above-mentioned fact that end-users are now content providers who co-create, co-share, co-consume through social media enabled by the Internet and cloud computing, it is clear that they are no longer passive, non-reacting, or receptive consumers. End-users are seen as the centre of the design of ICT products. Cloud computing has further pushed the current trend to a climax with the driving force behind it being human-centred technology thinking.

# 3. *Three User Personas as Three Types of Media Consumers*

Kilian et al (2012) identify three subgroups of media consumers from millennials to illustrate the heterogeneity of social media usage: the restrained (45.6 percent of the sample), the entertainment seeking (34.9 percent of the sample), and the highly connected (19.4 percent of the sample). Accordingly we establish three personas, Franck, Emma and Hank, to embody our studies, demonstrate our scenarios, and illustrate our end-user definition: (1) a person who has a Internet-based service user account and shares private information with a media service provider; (2) a person who is not willing to share private information and who consumes few media services; (3) a person who has a user account, shares private information and produces content for media service providers.

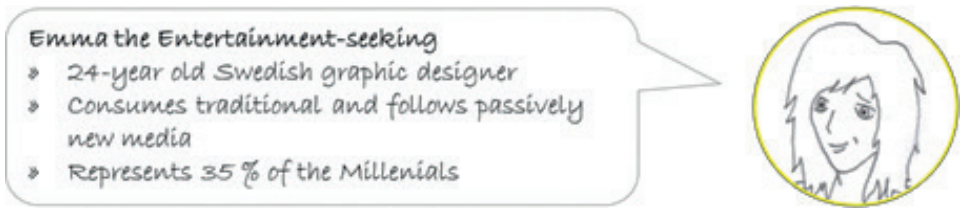
## 3.1. Franck the Restrained




Franck is a twenty-two-year-old French football player who is quite suspicious of the new services in the Internet and finds them cumbersome. He is quite happy with the

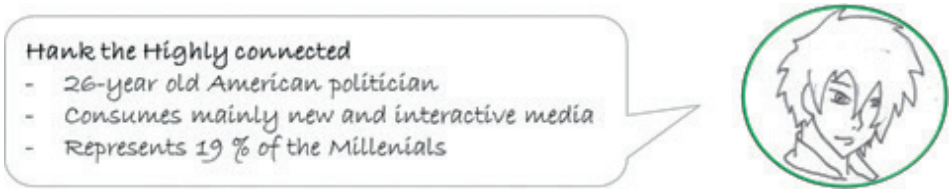
traditional media formats and reads a lot of books. He logs in to some media service approximately once a week to seek additional information or entertainment. He has a profile on Facebook but does not share too much information in there, and he never updates his status within his network. Even if Franck is satisfied with his social life, he might be excluded in the future, since he prefers traditional means of communication. One reason for his resistance is the privacy issues, which bother Franck.

### 3.2. Emma the Entertainment Seeking




Emma is a twenty-four-year old Swedish graphic designer who uses the Internet mainly to entertain herself. She still prefers traditional media, e.g., television, for the entertainment but uses the Internet in addition to it. She has subscribed to some entertainment services such as Netflix and Spotify but consumes mainly free content that she finds on social media, such as Facebook or Twitter. She primarily prefers social networking site for communication with friends. Emma is not as aware of or interested in the copyright and privacy issues but does not intentionally exercise piratism. Sometimes she might spend too much time on the Internet, and some people might call her a social media addict. Emma goes online to entertain herself and is not interested in politics or influencing.

### 3.3. Hank the Highly Connected




Hank is a twenty-six-year old American politician who frequently uses many media services, such as Facebook, Twitter, Google Maps and Dropbox. He checks these services many times a day and, for all of these services, has mobile applications that notify him even when he is on the road. He also has a blog, which he updates frequently. Hank also uses social media frequently in his professional life to spread content he has created. He is also politically active and discusses political issues in blog comments and in social media. Hank is concerned also about the privacy issues,

but he would not decrease his openness on the Internet due to that. Rather, he fights back against censorship.

# 4. Case Studies of Media Companies

As previous research has shown, the emergence of the Internet and new types of competition have led the traditional media industry to providing new forms of services (Evens, Lefever, Valcke, Schuurman and De Marez, 2011). In order to make our own observations about this researched phenomenon and to understand the end-users' media consumption, both today and in twenty years, we selected a sample of media companies and describe them in the following sections. These cases represent various types of media that are providing their services for multiplatform consumption either via a third-party cloud computing service or via the Internet.

## 4.1. Briefings of the Seven Selected Media Services

In order to provide a coherent snapshot of the media companies' use of cloud computing and the Internet, we have selected seven examples. In this section, we briefly illustrate how Twitter, Spotify, NBC, Sonera Entertainment (Sonera Viihde), YouTube, iCloud and WeChat build their service proposition by benefiting from the potential of a cloud service provider and/or the Internet as well as the mobile platform usage of the consumers.

Our first case, **Twitter** is a real-time information network that connects an end-user to stories, ideas, opinions, and news based on end-user interests. Tweets are 140-character units of information that the end-user can produce and follow on the network. Tweets can include photos, videos, and conversations to provide the whole story at a glance (Twitter, 2013).

An end-user can utilize services such as search, public user profiles, and viewing lists without registration, but, to get full advantage of Twitter and to be able to publish, an end-user needs to register by providing his/her name, username, password and email address. The username and legal name will be publicly available, as well as any other content by default, but an end-user can limit other contents' publicity through settings. Thus, our perception of Twitter as a medium today relates to, on the one hand, the evolution of personal messaging (Miller, 2010) but, on the other hand, the evolution of the news industry (Lapowsky, 2013). Twitter is analyzed as a mobile application in this study.

The second case is **Spotify**, defined as an online music service; according to the website, it contains millions of tracks. Music can be listened to by streaming or downloading to the end-user's device's mobile application. Users do not get any rights to the content except the ability to listen to it. There are two user categories: subscribed premium users

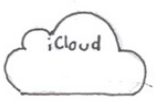
and 'free' users. Currently the 'free' users can create an account only if they connect it to their Facebook profile.

Among conventional media, the music industry has been a rare example in which the concept of the cloud has emerged at the beginning of the twenty-first century (Straubhaar et al., 2010). Already at the beginning of the new millennium, the possibility of end-users storing their music in the cloud was recognized as an alternative to recorded music (Straubhaar et al., 2010).


As the third and fourth cases, we have included traditionally perceived media companies, such as the broadcasting company **NBC** as well as the Finnish telecom operator company Sonera, focusing on only one of its products, **Sonera Entertainment**. The National Broadcasting Company (NBC) is a commercial American TV and radio Network for Primetime, Daytime, and Late Night Television and radio shows. Its history dates back to 1926 when the Radio Corporation of America (RCA), the oldest major broadcasting company in the U.S., formed NBC.

The services of nbc.com can be utilized by the end-users in the United States without registering, but the services feature the possibility of connecting with social media services such as Twitter, Facebook Tumblr, Instagram, Pinterest, YouTube and g+. Because of the future orientation of this study, NBC will be analyzed on the basis of its online services. Sonera Entertainment combines digital television to the wireless, high-speed broadband connection ordered by the end-user. Sonera Entertainment allows the end-user to sign in to their service account and to record any program on his/her digital recording set-top box, with any smart device, such as an iPhone. The service even allows the end-user to use the movie rental app directly from a smart device or a television (with the remote control).


For the fifth case, we considered the search engine company, Google's **YouTube**, which is a video-sharing website, as well as a mobile application through which users can upload, view and share videos. Individuals have uploaded most of the content on YouTube. To upload videos, a user needs to create an account or, alternatively, utilize an existing (Google's) Gmail account to sign in. YouTube provides privacy settings for each individual user to protect identity and maintain a positive profile while sharing videos online.




Then we also considered **iCloud**, provided by the computer company Apple. iCloud's 'cloud' service is available for free to anyone using an iOS device or OS X Lion or Mountain Lion. iCloud is predominantly a free service with the option to pay an annual subscription for increased space. iCloud builds, not only on an array of features designed to make using multiple devices much easier, but also on online storage of documents and pictures to make accessing them as easy as possible. iCloud secures your data by encrypting it when it is sent over the Internet, storing it in an encrypted format when kept on a server.


The last case is **WeChat**, a mobile social media with features like Live Chat, Group Chat/QR code, Chat History Backup, Video Call and Facebook Connect. It is a free mobile application available for iOS, Android, Windows Phones, BlackBerry, Symbian platforms; it started as an Internet Portal in China in 1998. The communication through WeChat can be personal or public, with a small group or for all. The message formats can be text, image, video, voice message and real-time live voice or video call.

## 4.2. Methods and Results

### 4.2.1. Legal Document Analysis

To access the outlined media services, end-users absolutely need to accept user agreements and terms. Usually a simple touch-click will do the job, but the actual content of the agreement will take some time to be found. With slight variation according to the nature of specific media, almost all of these legal documents share the following three main features.

- **General characteristics:** Simply by clicking 'agree' or by using the service, the end-user is bound to the legal confinement composed by the service provider. The majority of end-users click the accept bottom without reading the agreement content (though it usually is suggested with italic or caption letters under the 'agree'). Besides, these agreements are lengthy, averaging twenty pages in A4 paper font size 12. The language is often difficult to understand for common end-users, due to many specialized legal and technical terms. In most cases, it seems that the end-user is left without any other choice but to click 'agree'. Otherwise the service is not available. Often there is no room to negotiate the terms, such as to accept partially or simply to give feedback.
- **Personal data collecting:** Most legal documents declare that it is optional for end-users to provide detailed personal information and to allow the service provider to share with third parties. However, service providers often oblige end-users to agree to their personal data and usage record being collected. The excuse is to "improve their future service and technology". The collected data mostly are set to be shared automatically by the service providers with their related business entities and become part of the service providers' property. They are sellable and transferable once the business is sold to or merged with other companies.
- **Responsibility avoidance:** In most of the terms and user agreements, it is announced clearly that the service providers do not guarantee any technical reliability for safeguarding the uploaded contents by end-users. End-users shall take full responsibility to back up whatever is uploaded to the service provider's cloud. Moreover, in case of any security or legal concern raised, the service providers do not take any responsibility because they do not control or

monitor their users' activities and communications. End-users are advised to take measurement and be responsible for the public information s/he exposes. Nevertheless, even if certain information is set as private, they are still possible to be found by a search engine such as Google. To click the delete button does not guarantee the opted information will be deleted. In any case, all these legal documents have made very clear that whatever happens, it is not the responsibility of a service provider but of the end-user him/herself.

Generally speaking, all these terms and user agreements of media services do not mention anything about which cloud service they are employing on the back stage. According to some market surveys, by far the media companies either build their own cloud services or they buy it from a third party, e.g., Amazon or Google. In any case, the end-users are not informed about the existence of the cloud behind the media company in any of these documents. Therefore, they are not aware of the fact that actually they are facing double risks when the media services move to the cloud, as the terms and user agreements between the media companies and the cloud service providers are usually similar to the one between the end-user and the media service provider.

### 4.2.2. Content Analysis of Websites and Mobile Applications Table

In addition to the legal documents' analysis, we also needed to gather insights and comparable data from both of the case companies' websites, as well as their mobile applications (if they had one). We developed a two-fold test that allowed us to compare the types of services provided by the companies, as well as to measure the ease with which one could find the documents concerning privacy and terms of use.

The empirical research is based on our subjective assessment of various metrics (for details, see Appendix). In our measurement system, we observed each case according to the availability of information, such as the terms of use of the media's services and the ease with which the information was discovered. For the purpose of the research, service personalization consisted of the possibility to register for the media's service, the need to sign or log in, the possibility of signing up with a social media account such as Facebook and the option of utilizing the company's service without providing personal information.

When measuring the service personalization, consisting of metrics such as the option of signing up for the service with one's Facebook account, we found that on average, Spotify's website provided the easiest access. In comparison, the website of NBC provided few options for signing up or accessing any user information. In our assessment of the website's information that is relevant for the end-user, we found that NBC and YouTube provided the necessary information, for example, on privacy, in comparison to Twitter's mobile application which demanded more searching in order to find the privacy documents and terms of usage. NBC and YouTube had the easiest website structure, with the least clicks (See Appendix for charts of the case companies).

### 4.2.3. Three Personas' Media Consumption Habits

In this section, we reflect on our findings from the observations made on the websites, on the mobile applications, as well as in the legal documents (i.e., service agreements) of the case companies. To reflect possible use cases, the consumption habits of Franck, Emma, and Hank introduced in section 3 are evaluated by imagining their media consumption in relation to each case discussed in the case section. This is done, by examining the ways in which Franck, Emma and Hank would use the media services and which sorts of pros and cons their media consumption potentially includes.

To identify potential differences between the user persona's consumption habits, the user's plausible consumption activity was graded on a five-number scale, where 1 = never tried it, 2 = once, 3 = monthly or less, 4 = weekly, and 5 = daily. The grades are based on the writers' perceptions of Franck, Emma and Hank's personas.

Franck has tried each of the case media services, but, more regularly, he consumes only services such as YouTube and NBC, both of which do not require a user account, nor do they enable content creation. Emma consumes all the case media formats on a weekly or daily basis for entertainment purposes, but she does not create her own content. She is an active follower and provides her personal information to media companies such as Twitter, Spotify, iCloud and WeChat in order to get full access to entertainment, but also utilizes the services that do not require a user account. Hank utilizes mainly Twitter, Spotify, iCloud, WeChat and YouTube, because they allow him to customize and create his own content and share it in an integrated manner with his friends and business contacts by providing his personal data. He does not by and large utilize passive services where he cannot interact either with people or with the content.

As Franck pays attention to where he provides his information, his social media service utilization is limited. Thus, for Franck media formats such as NBC, YouTube, and Sonera Viihde are useful because they allow content consumption without having to log in, or to have a user account. On the other hand, he easily gets excluded from social circles and networks and does not have access to all information of services such as Spotify, Twitter, iCloud and WeChat.

Emma loves to consume entertainment and follow topical phenomena, and therefore she is more than happy to provide her information to media such as Spotify, Twitter, iCloud, and Sonera Viihde if she gets access to more entertainment. Also, more traditional formats such as NBC offer her advantages, as she does not want to create content herself but rather consume that of others. The possible disadvantages relate mostly to Emma's unawareness of where and whom the information she provides is given to and what her rights are if something unpredictable happens. She also tends to become addicted to television series and can accidentally spend a whole weekend watching a whole season of a TV series. She also is quite clueless about how much money she spends on renting movies online, which is why she might get into economical problems.

For Hank, the new types of media services such as Twitter, YouTube, and Spotify are advantageous. These media enable him to find similar-minded people and exchange ideas globally with the people interested in the same phenomena. YouTube and Twitter also allow him to create his own content and show what he is interested in, linking him with the global tribes. He finds the more traditional media such as NBC and Sonera Entertainment inflexible and too fixed, as they are not straightly connected to the social media or his personal data. The possible disadvantages relate to his openly shared user profiles, pictures and private information and a lack of privacy.

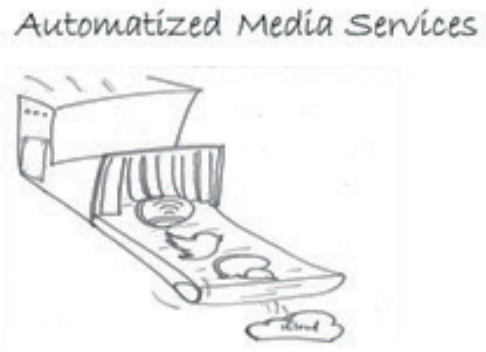
To conclude, Franck, Emma and Hank consume media in a variety of ways for a myriad of purposes. This is why potential positive and negative impacts deriving from the consumption vary significantly. On the one hand, the advantages scale from Franck's free time and worriless mind through Emma's ability to consume all the entertainment in the world to Hank's abilities to find extensive networks and exchange thoughts globally. On the other hand, the disadvantages vary from Franck's possible social isolation, through Emma's addiction and personal data acquisition, to Hank's privacy loss and potentially siloed view of the world.

# 5. Scenarios

## 5.1. Future Scenarios

In this section we look into the future via scenarios and offer recommendations based on our assessment of the existing literature, as well as our analysis. We offer four scenarios, on a micro- and a macro-level, which, it is hoped, will challenge the reader into thinking about the current knowledge the end-users have about the services they use and the possible consequences of ignoring the agreements made with service providers.

### 5.1.1. Automatized Media Services




In our first scenario, we consider a situation in which economical drivers push the media companies to jointly focus on providing only personalized, automatized servic-

es. As media companies have seen their target markets diminish and become increasingly fragmented, each has shifted to a subscription-based revenue model. Broadcasting companies failed to gain revenue via advertisements and therefore perceived an on-demand service supply as the most profitable approach.

In this scenario, automated marketing dominates the media supply offered to the end-user. All the information and media content in the world is digitized and offered from the cloud platforms containing the user information. This information is shared with the media service providers offering Media as a Service (see Fig. 2 for more information on MaaS). They also trade the user information between each other. On the background, below the SaaS layer, there is a cloud service provider who has full access to all the information. New analytic tools give valuable information for the platform providers, which they can use for economic profit or to enhance their gate-keeping power.

On a micro-level, the supply is considered to be low, as the media companies decide to provide only personified services based on personal information. There are no official TV programs being broadcasted, no print journals, no radio. Every company bases its services on the end-users' choice provided by sign up and by subscribing to the company's service online. For example, the supply of news broadcasting companies is based on an end-user's selection of country, language, scope of time, category of news and so on.

Thus, in this scenario the demand is relatively low, at least in the short run. If Franck subscribes to broadcasting services, he gets only news dubbed in French, regarding his favourite topic, football, and sports in general. However, assuming that an end-user such as Franck remains highly concerned over his/her privacy despite changes in the behaviour of media companies, it is likely s/he will not adopt and subscribe to these new technologies. Or, if s/he will, it will be after a majority has accepted the change (Rogers, 2003).

For end-users such as Emma, such an innovation in the media creates a challenge, as, although she is not concerned for her privacy, she is used to free services, except for Netflix. However, she will adopt the new way after the critical mass of end-users has accepted it (Rogers, 2003). Hank, on the other hand, is excited about the new personal feel in the services he uses. And, while he is concerned with his privacy, he is persuaded that as long as he critically weighs which services to subscribe to, he feels in control of the personal information he shares with third parties.

On a macro-level, the scenario creates a politically democratic atmosphere, as the end-users consider that, although they do not get any media services without subscription, they still have a broad ray of alternatives from which to choose. For media companies, such a scenario leads to decreases in supply, as not all companies are able to maintain a pull-based revenue model. However, it will take a long time before only the biggest media companies remain. Also, such changes affect people globally, as, depending on the regulations, the end-users are subscribing to the services of international media across national borders.

### 5.1.2. Cooperation and Open Policies


In our second scenario, we considered a situation in which legislative and regulatory drivers perceived by the companies lead them to update and standardize their policies and user agreements regarding copyright and privacy. An increasing number of security incidents, information leaks and government interest in intelligence information push governments to enforce new legislation on digital media.

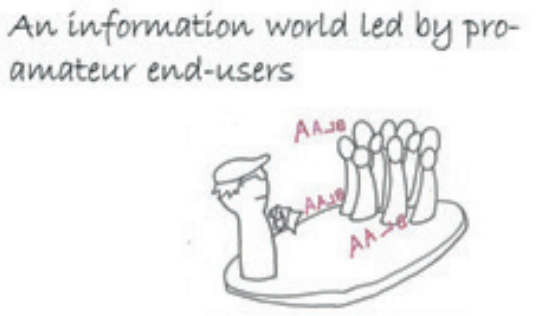
Meanwhile end-users become more cautious about giving out their information, which is generally required in order to use any of the media services (see more in section 4.2.1). End-users usually are not aware of how technologies and platforms work, so they find it easiest not to provide any information. If the personal information required for the service exceeds their limit of comfort, they will not use the service at all or they will give fake information (Davis, 1989). Therefore companies are introducing new data policies and are becoming more open with how they work and deal with data. They are collaborating in user identification, called 'Internet ID', the common login-system used by most of the media services providers.

Due to the continuing economic recession, the European Union enforced open media legislation, which stated that all media content has to be equally available in each member country with the same terms and conditions. Entertainment markets have been established to the point where the six biggest media companies dominate the markets. They benefit the most from the economies of scale, since they can offer targeted marketing and generate revenues based on the ad-based business models. Companies have been forced to register in some EU countries if they are to charge their customers. But in the global Internet markets, end-users such as Emma still manage to find services that are easier and cheaper to use.

National broadcasting companies have extended their services to social media and have introduced their own social media platforms. They are moderating the media to keep the discourse at a high-quality level, and many members of the parliaments are participating in the discussions. Further, the dialogue is kept relevant via detailed ranking systems so that everyone can post comments, but the members of parliaments do not see them unless the comment is ranked high enough. Hank, who has been interested in politics, has started using these services, and he feels that he is participating in political discourse.

Bandwidth faces increasing demand emerging from the higher quality media services. The network operators are forced to separate their media service businesses and network businesses. They are no longer able to gain competitive advantages with their own bandwidth, as higher demand leads to higher supply. Also, the development of the network that is required for the new high-quality video screening is still in progress, and traditional airing technologies still remain mainstream. Franck continues to use traditional media, such as TV, along with the Internet.

### 5.1.3. An Information World Led by Pro-amateur End-users




In this third scenario we see socio-cultural factors taking the lead in media performance and development. When the cloud computing turns media into a service-based business, end-users also cease to wait passively for information or media services and become active content contributors. At the same time being the sole revenue indicator for the media industry, end-users eventually acquire a predominant position in the media landscape.

From the micro-level point of view, in 2027 end-users no longer will need to worry about the data security issue, as it will be solved by legislation and technology. To defend privacy, hackers have managed to publish private information of those who violated the copyright issues online on a recently established website: ikonwwhatyoudidlast.com. The site was run by a human-rights activist group called 'The Restrained' and was led by a hacker using the name 'Franck'. A Global Internet law has been under development for several years, an initiative taken by the United Nations. The law, agreed on as a global agreement, states that no personal information can be provided any more to third parties for commercial purposes.

In the meantime, businesses have dramatically shifted from the facilitation of information toward managing, distributing and selling the information of their users to third parties. The content these third parties are provided has been increasingly customized. Due to the legislative restrictions, the companies are facing major difficulties with their business logics, as they cannot sell, nor can they utilize, the data on which their businesses are based. The whole business scenery has been and will be facing drastic changes. The content creators no longer gain information about the end-users, and, thus, cannot provide customized products. They are not able to advertise in a customized way on online platforms, therefore, decreasing the num-

ber of potential customers. They are losing money and need to create new business models to regain profitability.

As the end-users as a group are more heterogeneous than ever, they demand a variety of media, which is why many have become active media content creators and providers by, i.e., combining their Flickr, Facebook and YouTube channels with Smart TV, which has the capacity to allow them to broadcast easily. The line between media consumer and creator, gatekeeper and service provider, content seller and buyer has become very thin. In sum, Internet and cloud computing has shaken the conventional power structure of media industry to a macro-level so that end-users become leading players.

On the other hand, the end-users are facing an information overflow. Due to the customization paradigm, which was earlier made possible by the personal information provision to third parties, they primarily used to get information and media that they had consumed earlier, i.e. personalized content. Little by little, their social media profiles and the content they find through search engines begin to shift toward more coincidental results. Hank can continue his life more certain of his privacy, gaining more and more scattered information, not being able to spread or acquire opinions in as many channels as before through one click, ultimately resulting in more and more time spent online.

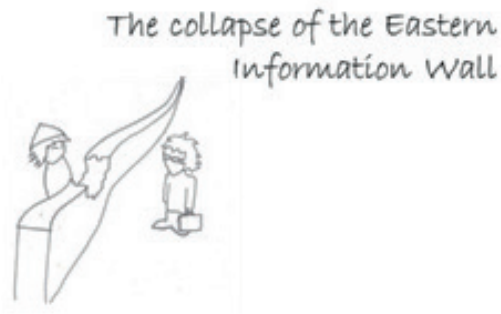
Franck is more and more willing to sign up for the social media services, as he feels he can provide his information safely and safely connect to his friends. Franck becomes a professional amateur in social media, as he can no longer tolerate being unaware of his football girl fans from around the world wow-ing everything about him online. Indeed, the total number of his online girl fans is so high that he can negotiate with the social media service providers for special offers and features best suited to his needs.

A whole new world opens for Emma, as she no longer gets only Justin Bieber's playlists as suggestions on Spotify, but on the other hand more imagination is required from her to find something similar to what she and her friends already like. Now she also dares to create and deliver her own content. Ever since her Adobe cloud account got hacked and personal banking data got stolen a few years ago, she has quit altogether using the commercial cloud media services and now uses only open-sourced information or media services. Issues of copyright and piratism become less important to her, as cultural and creative commons are well accepted by now. Equal access to the Internet, to information, to media, to upload and download has flattened the conventional pyramid society in knowledge, wealth, and power. She now happily shares her designs online for public use and downloads others' designs. She earns her living by the number of clicks on her works.

As a social activist, Hank is keen to expand the influence of his personal opinions locally and globally. Detesting the political conventions, he insists on being with people and running his social campaigns alone or with his fellow peers from the globe. His 'glocalized' network has gained a status of opinion leader in various

media. People listen to them rather than to some politicians or professional journalists. Thanks to the lesson he learned a few years ago when WeChat sold his image and text data to WeBlackmail, registered in the Cayman Islands, and made public his scandalous party photos, he succeeded in gathering millions of signatures in UN-member states and brought new laws to the International Court to force all media companies to make transparent all their transactions in capital, as well as in informatics.

### 5.1.4. The Collapse of the Eastern Information Wall




In our fourth scenario, we considered a situation in which the information availability drivers would lead to demolishing the information wall between the West and the East. This would make the East- and West-specific information globally available and open up new opportunities for companies working in both worlds and provide end-users with a possibility to explore cultures globally.

It is year 2027, and the world is more interconnected than ever. The basic personal data of the majority of the population on planet Earth is stored in six companies' ICT systems, mainly in the U.S., but also increasingly in China. More precise data is stored also in national governmental units. A handful of the biggest, most powerful companies are able to track the population's consumption habits, state of health, daily movement and personal relationships based on the data. Also, the NSA has free access to all U.S. content. China has the same information in the country's governmental system due to the strict national Internet policy built on Blocking and Cloning strategies.

For a long time the Internet had been divided into two: there is the Internet and the Chinanet. This construction has been the biggest virtual firewall globally preventing information sharing between the West and the East: The great firewall of China. The Chinese government has so far based its national Internet policy on two principles: Block and Clone. All the international Web 2.0 services have been blocked, and an equivalent system functions nationwide in China. The Chinanet is a clone, i.e., a copied version for basically everything in the Western Internet; all the servers are located in China, enabling tracking and censoring of all data. Google's equivalent is Baidu, Twitter's equivalent is Weibo, Facebook's equivalent

is Renren, YouTube's equivalents are Youku and Tudou, WhatsApp's equivalent is WeChat (Anti, 2012).

Due to a spread of the technological advantages, the information wall has slowly collapsed. New technologies allow all users, even those with no technical background, to bypass the information wall. The companies have started competing with each other in their niche market. A running competition to take over the market has started, and companies are creating subdivisions for Eastern and Western markets. The efficient on-time translator software has opened the Chinese media services to Western users and vice versa. Information between the Western and the Eastern world is mixed, and the information war continues.

After identifying the possibilities, Hank subscribes to the Chinese service companies, as he has been interested in the Chinese market and political sphere for a long time. Hank, who has been politically active online, is listed in the blacklist of the Chinese government because of his numerous five-year-old ironic tweets about China. All he follows and does in the Chinese clone services is under thorough investigation. If he would travel to China, he would be considered a spy and would probably be sent to jail. Emma also registers with the services, as she is interested in searching for novel entertainment from other cultures. Emma's entertainment consumption is under investigation by the Chinese government, as she has been watching alternative movies about an upcoming World War between the East and the West. Franck is very suspicious about the Chinese governmental actions and thus does not register for any of the services in the Western or in the Eastern world. Franck is the only one of the user personas who cannot be tracked and, thus, the only one left out of the information war.

However, in a longer perspective, companies have more and more power, as national borders are losing their significance. Then, the companies will be leading the information war rather than nations. Consequently, it will be difficult from an end-user point of view to recognize any company's origins as, for example, many Chinese companies gain a local stance in Europe and change their name to resemble a European company.

# 6. Discussion

Based on the whole study, we have identified major threats and recommendations to circumvent these threats, which we introduce in the following discussion section.

## 6.1. Major Threats

In the first scenario, the biggest threat to companies is the low demand for customized, subscription-based paid services. In such an environment, companies with the lowest demand may run out of business. For the end-users, those not willing to

provide a high amount of personal information and/or unwilling to pay for the subscribed services will experience a great lack of news and entertainment. Such a situation may, at worst, lead them to criminal activities in order to circumvent the existing restrictions.

The second scenario poses a threat mainly to companies, as they are dealing with intensified competition, especially in terms of finding the best and most affordable bandwidth for their digital media services.

Despite the wonderland-like nature of the third scenario, it follows the European humanistic spirit that appeared after the two World Wars. As a matter of fact, it is a highly potential scenario within the political framework inside Europe today. However, the disadvantages of this scenario are the problems that arise when facing the big powers of the United States, Russia, and China where capitalism leads the societal development. Thus, in the third scenario, due to a great disruptive innovation within society, the end-user will play a leading role in the media industry. Many small companies may fail to keep pace with giant companies and therefore collapse. This scenario accelerates toward conglomerate giant companies, by changing the business models in favour of openness toward this innovation. As a consequence, society will experience a huge economical instability. Many people in the media industry will be unemployed. On the other hand, it is not unlikely that some end-users will become malicious content distributors. Those users may create false and misleading information and distribute it through social media. Due to strong social network connectivity, malicious information spreads very fast and may create societal instability.

In the fourth scenario, the role of the governments is diminishing, and ultimately the corporations take over the power. Most of the gate-keeping power in the world is in the hands of a cluster of companies in the U.S. and one company in China. These companies can manage data easily and relate the information from different sources to obtain new information and can easily learn how crowds and individuals act. Thus they can easily shape public opinion by censorship, such as by giving less weight and visibility to information harmful to their purposes. The global information databases have become more and more relevant tools for power, and the corporations are standing on top of the information. The people are becoming the products, i.e., their personal information will become the most valid currency in the global business-to-business market. This might ultimately result in an oligarchy in which the information of the globe is allocated to a few corporations that are able to control the world. There are no free lunches; if the users are getting media services ostensibly free, they are paying for it in other ways.

Enforcing strong local legislation might make the markets of digital content inefficient and give competitive benefits to countries with broader legislation. However, the network operators on the content market should be regulated in order to prevent them from getting competitive advantages from their possession of cheaper bandwidth.

## 6.2. Recommendations

Based on the outlined scenarios, we have elaborated the following **four** advices to pinpoint the most crucial issues arising from media consumption in the cloud era: First, education by the public sector; second, proactivity and general awareness of the end-users; third, technology awareness and communications by the media companies; and finally cooperation.

- **Education by the public sector**. From the end-user point of view, it is crucial to gain knowledge of service level agreements, thus better understanding the rights and entitlement the end-user is giving its service providers. Such knowledge could be gained already at a young age via the educational system. For example, in Estonia children are learning the basics of coding in elementary school. In 2013, Alexander Stubb, Finland's minister of foreign affairs, made such a suggestion to be considered in the Finnish schooling system as well (Kelly, 2013).
- **Proactivity and general awareness of the crowd**. The end-users should acknowledge the constantly increasing customization which decreases the amount of coincidence and, ultimately, can lead to a world of silos. Therefore end-users should be active, rather than passive, information seekers because they are responsible for making sense of the world. The most efficient way to prevent private data loss or its acquisition by third parties would be to consider everything happening online or in the cloud as public information. As described in scenario number 4, the end-user's information seems to be used by media services as a currency. Advertisers are paying for access to specific user information segments. Companies are working on forming these segments and selling them to target markets. But, in the end, one cannot feed oneself with information. There are no free lunches – if you don't pay, you are the product.
- **Technology awareness and communications by the companies**. Media companies on the other hand will benefit from further understanding the technological functions of cloud services and therefore will be better able to communicate their service agreements with their customers. In order to be competitive, businesses also have to react dynamically to the constantly evolving markets through business model developments.
- **Cooperation**. Media companies should cooperate to generate standardized and open practices on how they handle private information. This could enhance the trust of the users toward media services. The governments can force these kinds of practices, but business sectors generally prefer self-regulation since it is more flexible. Also, security-centred services and mobile applications, such as Younited by the Finnish security company F-Secure, would allow end-users to use cloud-based services more securely (F-Secure, 2013).

# 7. Conclusions

The media landscape is changing for both companies and end-users due to technological, economical, political and socio-cultural factors. To simplify, media services today divide into two distinguished models: the traditional one-to-many distribution model where professionals create content for the public, and the modern many-to-many distribution model where the end users can produce content. However, cloud computing has altered the existing business models and provided new business opportunities for media service providers, as all content today can be provided in the cloud. This enables the data collection of end-users and the customization of content.

End-users form more and more diverse consumption groups, as some are suspicious about addictive features of digital media and about their private information stored somewhere in the cloud. Some users are eager to utilize the entertainment possibilities, and some find it compelling to spread their ideas and produce their own content online for the global market. The challenge of the media companies is and will be to attract all these groups of people. In order to survive the increasing competition, companies have to offer diverse possibilities for media service consumption, while maintaining the privacy of the end-users.

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# *Appendix: Quantitative Analysis of Company Websites and Mobile Applications*

The other focus of the observations was to compare the availability of terms of use, information of the end-user's privacy, as well as the information for contacting the company.

For each company's website or application, we looked at the amount of clicks required from an end-user to find the predetermined metric. After measuring the clicks, the points were assigned as follows: 1 click = 3 points, 2 clicks = 2 points, and 3 clicks = 1 point; if exceeding 3 clicks, no points were given. We used descriptive statistics to compare between the cases. The two charts below were constructed by using the mean of each case company.

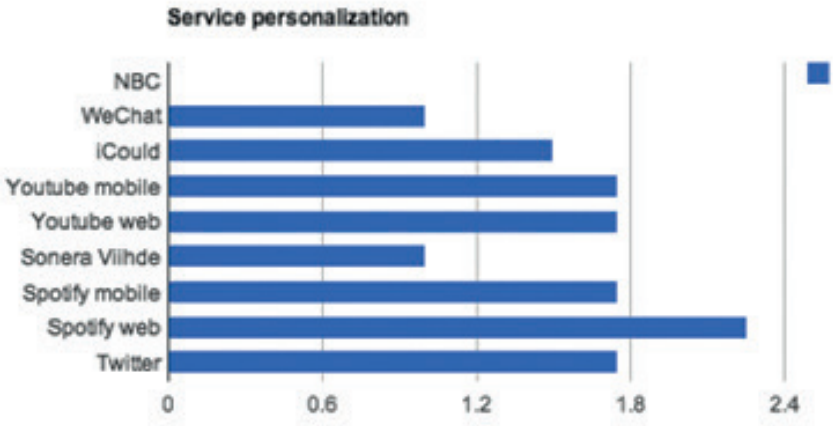


**Fig. 3.** ***Quantitative Comparison of the Personalization Level of the Service***

The higher the number is, the more the website and/or mobile application demanded the end-user to sign up, register, and/or use his/her Facebook account to log in.

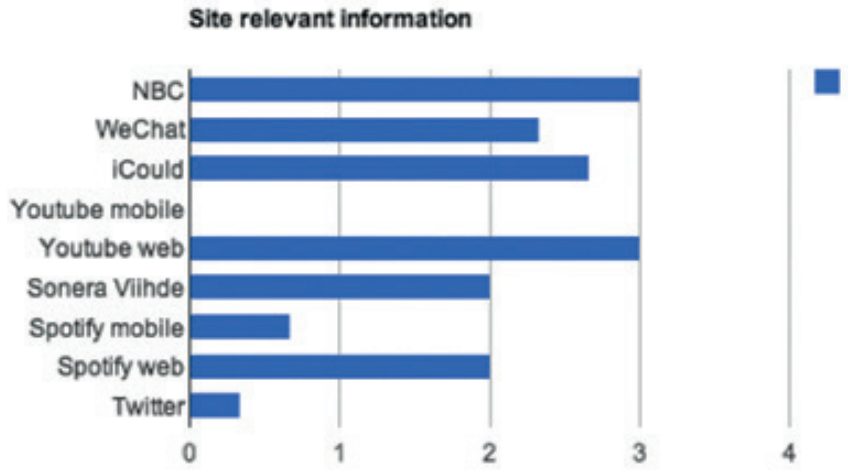


**Fig. 4.** ***Quantitative Analysis on the Website Structure***

The chart above takes into consideration the site relevant information; i.e., it allows us to compare the companies based on the ease with which one finds the information regarding the terms of use, as well as privacy and contact information, from the websites. As the chart shows, NBC and YouTube had the easiest website structure, with the least clicks.

# Crowds and their Disruptive Influence on the Development of Journalism

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**Abstract**. Journalism, as we currently know it, is going through the biggest change in its history: while messages of few people or organizations used to have enormous impact on the opinions of audiences in the past, now the internet has allowed entire communities and crowds to gain much of such influence. Consequently, traditional media try to engage their audiences in content production by different models of participatory journalism, such as user generated content, collective intelligence, crowdsourcing, open journalism or networked journalism, and thus engage them with their

brand. While these models may differ in their final outcomes representing various forms of media products, the main principle, however, remains the same: to let amateur audiences take part in designing and creating journalistic content. Despite the fact that journalism has existed for 500 years and participatory journalism has been there since the Web 2.0 (around 10 years), the internet is disrupting many old business models and creating new ways to extract value from quality content.

This article discusses the value network of participatory journalism and analyses a number of cases or phenomena that we expect to have a significant impact on journalism: Scoopinion, Scoopshot, Pearltrees, Oma Olivia, and WikiLeaks-like platforms. From the analysis of these cases we derive trends that are steering the future direction of journalism: relevance, sharing, community-created content, a tendency towards mixing professional and amateur content, as well as richer content complementing text. We reflect these trends against the views of media professionals and finally forecast what kind of implications the ongoing redefinition of "journalism" might have on the journalistic process in the future.

**Keywords**: Journalism, Participatory Journalism, User-Generated Content, Prosumer, Business Model, Crowd-Sourcing, Future, Trends, Forecasting.

# 1. Introduction

On May 16th 2011 Stefanie Gordon sat on an airplane on her way to Palm Beach, Florida. Suddenly, above the clouds, she saw a space shuttle dashing toward space. She took her smartphone and captured the moment. After she had published the photo on her Twitter account, she started to get contacts from newspapers, online magazines, etc., wanting to publish her photo of the space shuttle.

This real-life story illustrates the simplest opportunity individuals have in contributing to content production also in "traditional" mass media. In this chapter we aim to shed light on and map participatory journalism from several viewpoints: audiences, publishers, distribution channels and content. We also take a look at seven cases that demonstrate the various possibilities of cooperative journalistic processes. In reviewing already established and new business models, we have looked out for trends that can predict how journalism will develop over the next ten years, and what role formerly passive audiences transforming into now more or less active producers play.

## 1.1. (Re)Defining Journalism

"Traditional" journalism is often defined from the viewpoints of the different levels that affect each other: "the communicator" (micro level), "the professional environment" (meso level), and the prevailing culture (macro level), which obviously affects both the journalist and the environment in which they are working (Deuze & Bardoel, 2001; Deuze, Bruns, & Neuberger, 2007). However, recent changes on the macro level – the cultural transformation from "elite expertise" to "do-it-yourself" mentality – combined with the fast technological changes enabling the participation of users and entire audiences in media production have forced both individual journalists and publishers to take difficult steps (Lewis, 2012b). While institutional and cultural conditions and interactions provide the ground for defining 'journalism', their current change given rise to rethink the definition.

Journalism as a profession can be defined based on the journalistic work process: "journalists are those individuals working within an editorial board or newsroom (be it full-time or freelance) who perform one of four core journalistic tasks: selecting, researching (or: gathering), writing (or: processing) and editing news" (Deuze & Bardoel, 2001).

For decades, journalist work processes have remained relatively fixed and thus also the business models based on journalistic work have been successful. The digital and technological changes, however, have set free both content and distribution processes, and now the former, largely closed and controlled process is suddenly open and accessible to everyone (Lewis, 2012b).

Lewis (2012b) opens up the conceptual construction of journalism to its current form through the journalists' "boundary work": the values and demarcations, which have been "codified" and "legitimated" for professional journalism. Objectivity, au-

tonomy and working as watchdogs have been three of the predominant qualifiers of quality journalism (Lewis, 2012b), and even though these are much rhetorical boundaries which strengthen the expertise of journalists, at the same time they make it difficult for outsiders to deploy them (ibid).

However, bloggers' work processes and conceptions of "journalism" have been studied and it was found out that if they perceived their work as journalism, they also started adapting journalistic practices: checking facts, referring to sources and editing content afterwards (when and if needed) (de Zúñiga, Lewis, Willard, Valenzuela, Lee, & Baresch, 2011).

## 2. *Participatory Journalism*

Crowdsourcing, participatory journalism, open journalism, or citizen journalism all refer to collaborative processes where professional journalists and amateurs produce content together. Deuze et al. (2007) define participatory journalism as "newswork where professionals and amateurs collaborate and interact with each other". Even though crowdsourcing (or collective intelligence) and citizen journalism are not new phenomena, the traditional newspaper and magazine publishers have not utilised participatory forms of journalism until recently. User generated content has been a part of e.g. news sites sections for comments, but has remained an unidirectional channel and unexploited. There are, however, an increasing number of business models and media concepts in which a) content generated by users is utilised by professionals and the users are even paid (see Case Scoopshot); b) content from professionals and amateurs is considered of equal quality (Case Instagram); and c) the journalistic work process is opened for amateurs (Case Oma Olivia).

Peer-produced content has increasingly become an important feature in many user groups. Adults value the peer level of news: the comment section under articles, discussion forums and discussions about specific news linked on Facebook. Teenagers, on the other hand, consider peer-produced content to be self-evident in all forms of media. They follow textual, visual and audio-visual content on their peers' video blogs (vlogs) and channels on YouTube, blogs and different kinds of social media (e.g. WeHeartIt, Instagram, Spring.me). In fact, they value a peer-based viewpoint so much that it affects the engagement with the traditional media negatively, e.g. with magazines, where peer-produced content (and/or producers they know) is often missing (Perälä & Helle, 2012). Therefore, many women's magazines, for example, have built for their readers an online community in which content produced both by peers and professionals is available. Such examples also show that crowd-curation, i.e. the process in which content is no longer curated by the publishers' gatekeepers alone, but also by its producers, is a viable option in the future journalistic process.

In the past few years especially magazine publishers in Finland have designed various participatory concepts in order to engage their readers and also to find new audi-

ences on online platforms. Lily.fi is a platform for bloggers, which was established in 2011 by A-lehdet (a Finnish magazine publisher). Lily.fi is an open blog portal, where anyone can start a blog. Already thousands of users have their own blog on the site. There are also 18 "recommended blogs", which get paid for regular posting. The editorial staffs of Lily and the Trendi magazine also have their own blog where they curate both the content of the recommended blogs and the regular blogs, and in addition promote the journalistic content of the magazine.

The branding of the producers and bloggers as persons has increased hand in hand with blogging. Many bloggers have started as amateurs, and as the number of their readers, followers and visitors have gone up, the bloggers have become celebrities and could also be considered professionals in what they are writing about. Especially many women's magazines have hired these celebrity bloggers for their web sites. What could be an easier way to get new online users than to get famous and familiar bloggers – who bring their loyal and engaged audiences with them?

Blogs as a medium or as business models become more professional also in terms of economy. Blog portals gather individual, known blogs under their umbrella, and can thus sell their audiences for advertisers. Individual blogs' visitors are not a big enough audience for many advertisers, but as the portal can sell advertisers of the audiences of e.g. six fashion blogs, the exposures are beginning to pay off.

In the following years media companies will need to develop innovations and new concepts that enable audiences' participation of and contribution to content production. In order to start valuing content – which is not necessarily produced by professional journalists in the editorial room alone but by engaged and loyal users, who even might be experts in what they write about – some boundaries must possibly be surpassed or redefined. Also, it must be considered what the meaning of journalism and content for the audiences is. A good example is a business-to-business magazine described in Scattergood (2013). It got tired of the race against time and frequently updating channels on the internet. Instead, they decided to modify their concept / model by starting to provide their readers access to several databases, while at the same time curating the content, of course. According to the latest studies (Lewis, 2012b), there are signs that journalism and journalists are consenting to the prevailing conditions. Renaming 'journalism' in some cases could be a solution: The Knight Foundation (US journalism foundation, independent from Knight Newspaper chain) has started to talk about the less ideological concept "information" instead of "journalism" that carries strong connotations (Lewis, 2012a). Traditional publishers need to take the prevailing cultural conditions and new models of content production into account and adapt to these. And in journalism, breaking or at least lowering the boundaries between professional and amateur content could be beneficial in improving the overall concept.

## 2.1. Participatory Journalism Value Network

The concept of a value chain has been popular for many years to understand and analyse industries. The focus of the value chain is on the end product and the chain of activities to produce it. Each activity adds value to the previous one resulting in an end product that is ultimately passed to a customer. A successful value chain examines the value and the cost of each activity looking for ways how to improve these and to find advantages against competitors.

In journalism, the value is usually co-created by a combination of the parties. Therefore, instead of a value chain, we here prefer to use the concept of a value network in order to analyse the creation of value in content production. In the value network of journalism, there are *producers* that are producing content that can be edited and combined by *distributors* to the final media product consumed by individuals or *consumers*. Consumers typically pay money for the content to the distributor that, in turn, pays some portion to the producer(s). In other words, the network creates the content and distributes it to consumers that directly or indirectly pay for the content to distributors and producers. The value network in journalism is illustrated in Figure 1.

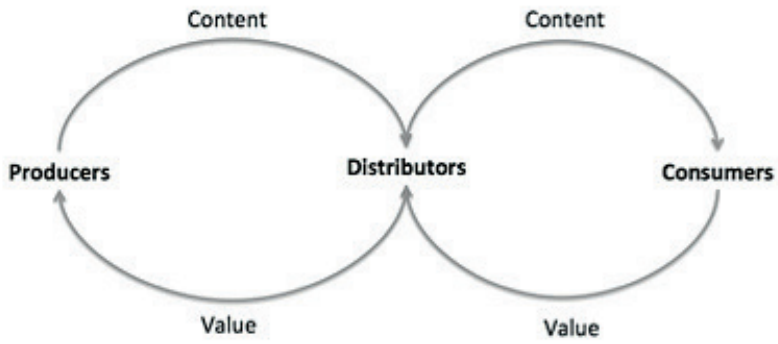


**Figure 1.** ***Journalism value network.***

A participatory journalism value network can be described using the value network of journalism: the same parties can be identified; the same processes are there. However, the participatory journalism value network differs from its traditional counterpart in various ways:

- The borders are getting blurred between producers, distributors and consumers (Lăzăroiu, Păun, Goran-Băzărea, Danciu, & Marin, 2011). Users can take the role of producers, moderators, and readers at the same time (Detecon Consulting, 2010). These users can be called "prosumers". Prosumers can

mean professional-consumers or producer-consumers depending on the context.

- The most significant consequence of an internet-centric world lies not in the domain of consumption, but in production (Hanna, Rohm, & Crittenden, 2011). This means that involvement of audiences in media production enabled by the internet is a huge shift in the paradigm of media production/consumption.
- The amount of user-generated/crowd-sourced content is rapidly increasing and also already becoming widely adopted by online news media for some time (Thurman, 2008). The "wisdom of the crowd" has been shown to lead to more precise and correct information in some cases (Surowiecki, 2005).
- One or more new business models will emerge. This shift replaces losses in print revenue with new digital revenues. The shift will take time and has created uncertainties in the industry (Rosenstiel & Jurkowitz, 2012).

The different components of the value chain will be discussed in details in the following sections. The roles of producers and distributors will be explained first. Sections describing the impact of participatory journalism on content and its value will follow.

## 2.2. Producers

In this section, we explore the question: who is producing journalistic content? There is a wide range of answers to this question depending on the type of journalism and its context. For this reason, we start by exploring the contexts in which journalism happens and then try to identify who the producer is.

The context in which we live is deeply influenced by internet technology, so it is logical to take the internet as the starting point for our analysis. Also, we note that journalism is a part of the media ecosystem (Hanna et al., 2011), and thus, we can broadly classify our context in two stages from the internet viewpoint, the *pre-internet stage* and the *internet stage*. In the first stage, we identify traditional media, which we call *legacy media*. Legacy media is characterized by a centralized production and well-controlled distribution channel as will be seen later. In the *internet stage*, media becomes linked to the internet not only in the distribution phase, but also in the participation of the audience in the production process. The involvement of audiences in media production enabled by the internet is a huge shift in the media production and consumption paradigm. Hanna et al. (2011) acknowledge that "the most significant consequence of an internet-centric world lies not in the arena of consumption, but in production".

In a more broad sense, the concept of producer is related to two fundamental ideas, the existence of a product to be consumed, and the existence of an entity producing it. We call the latter the producer. To be more specific, we introduce a classification of contexts based on the internet as sin Table 1.

**Table 1.** ***Classification of contexts based on the internet.***

| Participation in media production degree | Pre-internet stage | Internet stage |
|---|---|---|
| Little (or not at all) | Traditional journalism = legacy media | Traditional journalism and online journalism |
| Medium/high | - | Participatory journalism |

In the pre-internet stage, we identify traditional journalism, in which the producer is an established institution, e.g. a newsroom where journalists perform one of the four core journalistic tasks (selecting, researching, writing and editing news). The production process is well-controlled under the supervision of the editor-in-chief, and any user participation can be performed only under the strict supervision of the institution, e.g. audience's opinion is expressed only in a "letters to the editor" section. User participation can and may exist but its content is completely controlled by the editorial staff.

In the internet stage, the internet as a bi-directional and distributed medium enables audiences to participate in the creation process (Hanna et al., 2011). This creates enormous opportunities for user participation. For example, the first manifestations of user participation in content creation are internet forums, chat rooms and blogs (Butler, Sproull, Kiesler, & Kraut, 2007). Another effect of the internet is the awareness of users as creators. In other words, users are getting used to the act of creating content, which is forcing traditional journalism institutions to make user participation as flexible as possible (Canter, 2013). By observing the latter definitions, we can identify two types of producers:

- Professional producers, which include established institutions and journalists with formal training in the profession and
- Non-professional producers, which include amateur users interested in creating journalistic content.

A note about the motivation of non-professional producers needs to be made. In the Bit Bang 4: Future of Internet report (Bit Bang 4, 2012), the authors identified a number of incentives that motivate users to participate in co-creation activities. The article classifies the motivations in two groups, extrinsic and intrinsic and the following examples were given: "Examples of extrinsic motivators include monetary rewards, user needs, career concerns, skill development, and reputation, whereas intrinsic motivators can include fun, autonomy, intellectual challenge, identity, addiction, etc."

Finally, we would like to briefly describe the relationships between the degree of participation and the type of journalism which is also stated in Table 1. In traditional journalism, which belongs to the pre-internet stage, we identify mainly professional producers working in media production. Furthermore, the degree of participation from audiences is very low and it is controlled a priori.

In online journalism, which belongs to the internet stage, the internet is heavily used as a distribution medium. For example, news distributed directly to mobile apps is well-studied in (Westlund, 2013). The degree of participation is similar as in the case of traditional journalism because the internet is used as a unidirectional medium. However, traditional news producers heavily use content produced by non-professionals in exceptional occasions e.g. the London bombings in 2005 (Canter, 2013) or the Japan earthquake and following Fukushima nuclear accident in 2010. One characteristic mentioned in (Westlund, 2013) is that traditional news producers feel pressure to produce content for all available platforms, e.g. for different mobile operating systems, such as iPhone OS, Android, Windows Mobile or the internet in general.

In participatory journalism (Deuze et al., 2007) content is produced by a collaboration between professionals and non-professionals. For example, a case studied in (Canter, 2013) indicates that the professionals hold the role of content moderators and the bulk of the content is produced by non-professionals.

## 2.3. Distributors

*Distribution* is defined as a mean of spreading the media product created by producers to audiences. Distributors are entities, individuals, organizations, or devices that have the role and responsibility of distributing the end media product. They perform this task using several methods and distribution channels.

In many value chains, the difference between producers and distributors is subtle, since their roles are highly related in many contexts. The value chain of participatory journalism is not an exception to this rule, and we note a significant overlapping between the creator and the distributor of the content in a specific channel. In the context of participatory journalism we are interested in the distributors of news. News distribution is one of the key factors of the new emerging model of journalism which we are describing.

The media landscape, and subsequently the news landscape, is marked by a never-ending sequence of changes, revolutionizing the information, communication and distribution technologies. Since the advent of the internet, the scenario of distributing news has changed radically. These changes extend to our view of us as a part of an *active* audience producing and distributing news itself. Indeed, this extraordinary internet evolution has given rise to a new breed of cyber village correspondents. Equipped with little more than a mobile phone and an inquisitive nature, these former audience members provide valuable content for media (Canter, 2013). Audiences have a growing expectation to be involved in the news-making process and are actively chasing discovery rather than passively just being informed (Canter, 2013). This expectation is at the heart of the production and distribution processes in participatory journalism, leading to redefinition of journalists as gatekeepers of news (Canter, 2013).

### 2.3.1. Methods of Distribution

The huge variety of distribution methods can be divided into two classes according to their appearance with respect to the advent of the internet: *pre-internet methods* and *internet methods. Pre-internet media* are also known as legacy media. *Internet methods* are the methods whose evolution has been remarkably significant after the birth and explosion of the internet, which is viewed as the turning point of media consumption, production and distribution.

The first used and reliable pre-internet distribution methods were printed newspapers. With the advent of radio and television, the distribution methods changed again; the distribution of news was amplified by the power of these two media. In 1983, the first mobile phone was commercialized by Motorola and, after that time, the market of mobile phones grew exponentially. In 1993, the first SMS text messaging service was launched in Finland by Nokia and, in 2000, the same company launched the first mobile news service via SMS. This was one of the main turning points for news consumption pushing many other companies to enter this market that created and provided many on-demand news and advertising services utilizing SMS text messaging. The way of consumption of news changed at the same time as the way of distributing news. The platform was extraordinary innovative, but still the role of audience was marginal with respect to this distribution method. The audience passively obtained information and news by the distribution channel.

The birth of the internet has had an immense impact on the society which is only comparable to the introduction of printing. The consequence to this development was the thriving of many websites that can be characterized by users sharing their opinions and information of various kinds, such as forums and blogs, as well as websites featuring news, such as online journals. Later, internet has witnessed another main internal revolution in terms of communication between individuals: the birth of social networks. The social networks modified the conception of communication and human relations, becoming also another way of spreading news and hence another method of distributing them. Another step toward the current situation was made when the mobile devices (for instance, the mobile phones known widely as *smartphones*) came with an integrated wireless internet connection. Since 2007, big companies such as Apple, Google and Microsoft have entered the market as powerful shapers of the mobile media industry alongside giants such as Samsung and Nokia (Westlund, 2013).

Today, many people have access to updated news in any place and at any time by connecting to the internet with a mobile device. Mobile news publishing involves multiple means of distribution, from customised news alerts by SMS or MMS to mobile news sites and convergent mobile news applications (which commonly and hereafter are referred to as apps). In addition to mobile news consumption gaining popularity, the production of mobile news services has also thrived (Westlund, 2013). From the perspective of news publishers, several mobile platforms have emerged on which they can, and increasingly do, feel pressured to publish their news. This

has created ever more complex and costly challenges for news publishers, who must explore new ground when developing attractive mobile apps (Westlund, 2013). The natural consequence of this market trend is an extreme competition in attracting the audience to their news.

### 2.3.2. Distributors and Consumers: Editing and Censorship

The need to satisfy consumers' demand of personalized news services and their request of taking an active part in the news-making process has lead (online) journals to ask readers for creating content. Many examples of this participatory journalism, as defined in the first part of this report, has happened in the area related to investigative journalism (Vehkoo, 2013). The main feature of this collaboration is that once content is created the professional journalist edits it and then publishes its final and polished version. In other words, this is a model of distribution in which the professional journalist represents a gatekeeper, while the consumer is a non-professional collaborator whose product is edited, censored if necessary, and then distributed. This model has led to conflicts between professional editors and users (Deuze et al., 2007).

### 2.3.3. News Aggregators

Another level of distribution involving an entity called re-distributor of news is gaining a lot of attention by audiences as well; these entities are also called aggregators of news. News aggregators are websites gathering news updates and information from other sites, creating a unique and richer information space for the user, the personal homepage. The aggregator compiles feeds from various online sources, usually selected by the user, and automatically updates a user's homepage. News aggregator services are often offered by webmail providers. Examples of news aggregators are Google news, Reddit, Pulse and Scoopinion (Case B, in the section of participatory journalism cases in this report). It is worth noticing that social media are becoming strong news aggregators. For example, social networks are becoming a key gateway to news for younger people. In the United States 38% of under 45s and in urban Brazil 62% of under 45s say they find news this way.

The fast growing influence of news aggregators also creates conflicts with news providers. One remarkable example of these conflicts happened in 2011, when the Belgian Court of Appeals ruled that Google was infringing the copyrights of Belgian newspapers by linking to and posting portions of the articles on Google news.

Pre-internet media, i.e. TV, radio, and print, remain largely the preserve of traditional news organisations, while the online world has brought about new and enhanced competition. Globalization and the consequent possibility to operate in a global market without national boundaries have encouraged the growth of new players like Yahoo, Google News, and The Huffington Post. Blogs and social media are increasingly seen as a regular source of news. As demonstrated in Figure 2, the picture remains uneven, with traditional media most dominant in countries like the UK and Denmark. Aggregators and new players have had the biggest impact in Japan and

the United States, while social media have the strongest influence in Brazil, Spain, and Italy.

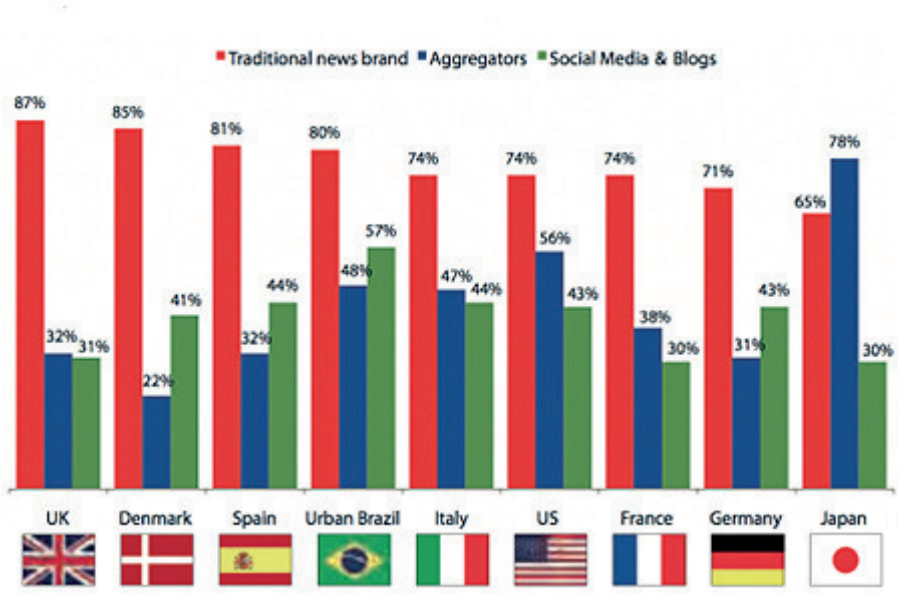


**Figure 2.** ***Competition between distributors.***

## 2.4. Content

The importance of content in the journalistic process cannot be overstated. When looking back to the newspaper industry and TV media, one realizes how these models are more distribution-centric than content-centric. The situation is changing with a variety of new online distribution channels and with user participation in journalistic content production. The journalism industry is in a midst of turnover and the declining profit provides incentives to innovate and be creative. This enables more content-centric journalism to be prevalent today – consumers not only have more means to choose their preferred content, but they can as well be the creators of the content (thus prosumers). This section discusses how the changes in the journalistic landscape shape or create new types of journalistic content.

The journalistic content naturally gravitates towards the latest technology, such as internet, social media, mobile technology etc., and it therefore also changes its shape and agenda and, possibly, its quality. The traditional journalistic business model is based both on news content and, even more, on the advertising that came along. According to a report by the Newspaper Association of America (Rosenstiel & Jurkowitz, 2012), the print ad revenue continues to decline and the industry adapts by finding new avenues of income through online content and social media. A question

that arises in such a situation is: whether the readers are willing to pay for the quality content online, when they are not bound to pay for ads as before in printed journalistic material, or do the publishers need to turn to new types of content to engage their audiences. In participatory journalism, the content is produced by networks, a self-organized cooperation between the crowd and professionals journalists. Moreover, the new types of content are also often produced for free. These are all factors that shape new types of journalistic content.

First of all, online journalism offers much more amorphous and fluid content compared to the newspaper. The diverse, steadily expanding user-generated content (UGC) comes in novel types of forms: comments, forums, blogs, short messages and microblogs, reports, reputation systems, multimedia content and social media sites. All those forms of UGC can serve as sources of journalistic content, distribution channels, or journalistic content quality and curation methods.

One of the first new types of content that come with the online journalism are readers' *comments* that follow the news. Comments provide two-fold benefits. On the one hand, readers are engaged in discussion and thus news content is expanded by an opinionated debate. On the other hand, publishers are welcoming the discussion as it increases their readers' engagement, while they can observe and analyse the comments in order to learn about readers' taste and preferences in order to be able to adapt their news site content accordingly. Publishers are experimenting with different types of commenting systems, which are either threaded or not, and the most popular format needs yet to be found. However, comments can also pose problems for a publisher, in particular, if moderation does not take place. One example of such a situation is the Delphy AS vs. Estonia case from Estonia (ECHR, 2013). Online journalism also includes a variety of *multimedia* content: images, video and sound. Such content causes inherently different journalistic experiences and user perceptions. More and more online news publications offer video clips of a news-worthy event, live interviews, or a good moment in sports or culture.

Compared to traditional news where agendas are set by professional journalists, readers choose their topics of interest themselves today. This has led to an increased popularity of regional and local content, and also enlarges niche content in general – a phenomenon brought by the internet not only to journalism but to other media, such as movies, as well. In the new setting, also more personal ideas emerge, and the volume is steadily expanding by increasing number of contributors. In such a vast amount of content, a new need of finding content of (personal) interest also emerges. Answering such a need creates novel start-ups that provide personalized and socially mediated news distribution, such as Scoopinion, which we discuss in case B.

Since the quality of journalistic content is highly determining its entire production process, and participatory journalism introduces changes in content quality, we discuss these changes in a separate section.

### 2.4.1. Quality of Content

The quality of the new types of journalistic content might require a different type of assessment compared to the professional journalistic content. In the context of participatory journalism, the quality of the collaborative process is difficult to access as the reporting quality is different between the involved and contributing individuals. Perhaps more importantly, the accuracy and the origin of different facts might be difficult to verify. While sometimes required, secrecy is not an issue when a single journalist develops a story. In case of more than one reporter, however, we have a more complex situation.

The gatekeeping function performed by publishers in traditional journalism is also changing in participatory journalism. Depending on the degree of user engagement in the participatory process, publishers might have little or no control over user-generated content. Their role shifts from being a content producer to content curator. Moreover, even the process of UGC curation might get outsourced to users. Other means of selecting content exist also, such as machine learning algorithms. When it comes to monitoring the content against vandalism and threats, or against violation of laws and other people's rights, professional journalist curators are still required. Wisdom of the crowd might be another answer to the content curation, where successful examples already exist. Rather recently we witnessed false news that went viral, and very soon the crowd reacted by finding the truth behind. An example of this case has to do with the Volgograd bombing, where the Russian state channel NTV released a passport photo of the suicide bomber – wearing a hajib. Online bloggers and users of Twitter rather quickly reacted that such a picture, according to law, cannot be from her passport, and soon after, a real and damaged picture from the passport turned online (Sean's-Russia-Blog, 2013). In the second case, as an opposite example, information that was crowd-sourced via reddit and 4chan and then reported quickly by a tabloid, turned out to be false. Namely, The New York Post wrote on the front page about Saudi person being arrested and showed pictures of suspect in the case of Boston bombing – both information proved to be false, as later responded by the police (Ryan, 2013).

While most often discussed in the context of news curation, the content that will more likely reach the readers might as well be only the content that is "more likely to catch on" (Berger, 2013). This is an important aspect to have in mind when thinking about the future of journalistic news content, under such circumstances when curation is becoming less viable. Perhaps the most difficult issue to control becomes copyright infringements and content rights. Some crowd-sourcing mechanisms that emerged in order to prevent the former are social vetting and registration of content contributors (with social ids).

### 2.4.2. Summary of Content Changes

The main concepts that can summarize the journalistic content changes in the era of participatory journalism are, thus, as follows:

- A wider range in **quality** and more challenges in **evaluating** it.
- **Richer content complements** text: media content and interactive content.
- **Copyright** and **trustworthiness** issues increase (even though the second issue can actually be avoided by the wisdom of the crowd in many cases).
- Increased **niche** content-types (local and regional news, high-school sports etc.).
- We witness a move from closed to **open**, and certainly expect only increased openness in the future.
- **Mobile** journalistic content consumption increases the shift from text to richer content types; however, text content will not be fully overtaken.
- Even though not so obvious, we think that the issue of **language divide** becomes more important in the new journalistic landscape.

In the end, we once again point out that, no matter of the changes it undergoes today: content is still the essence of journalism. The described changes increasingly stimulate a debate about whether content is and should be *"either free or fabulous"*. Answering this question, in turn, requires different and new business models.

## 2.5. Business Models

Traditionally business models in media involve companies' competences, value created, products/services provided, customers served, relationships established with customers and partner firms, and the operational requirements (Picard, 2011). This broad conceptualization regarding media serves also as a source of inspiration in exploring business modelling in the current context. However, as noted previously, the traditional journalistic business model is based both selling professional journalistic content and, even more, on selling advertising alongside. Whereas the versatile and diverse nature of contemporary journalism calls for a novel understanding of business models, until recently, journalism has embraced more classic revenue streams and business models (Sirkkunen & Cook, 2012), such as:

- Advertising: banner advertising and corresponding cost per view, cost per click, or cost per action models, weekly and monthly rates, advertising networks, sponsorships
- Pay for content: Paywalls and subscriptions, memberships, freemium
- Affiliate marketing
- Donations, crowd-funding, philanthropy
- Selling data and services
- Selling technology
- Events
- Freelancing and training, consulting
- Merchandise

However, due to the participatory journalism value network (see Figure 1), novel conceptualizations of producers, novel digital distribution options and the nature of fabulous content, the current understanding about business models is too narrow to solve the contemporary challenges of journalism (Picard, 2011). For example the transition from print to digital results in revenue losses in journalism, as today for every $1 gained in digital $7 are lost in print revenue (Rosenstiel & Jurkowitz, 2012).

### 2.5.1. Business Opportunities in Journalism

As the paradigm change in journalism drives the growth of new business opportunities (see Figure 3), also the number of business model initiatives increases. As noted previously, novel business opportunities emerge for example in the following areas in journalism: content creation, content commentary creation, content curation and distribution (Downes, 2009), which all play a vital role in business modelling, either per se or as an element of a bigger ensemble. First, revenues from journalistic content may be created and harnessed by professional journalists, professional bloggers, non-profit journalists, and amateur bloggers. Second, the value from commentary can be created and harnessed by pundits/columnists, bloggers and scholars. Third, the monetary value from curation can be created and harnessed by professional journalists and editors, aggregators, group filters and almost anyone in the social media. Fourth, the monetary value from distribution can be gained through traditional media, aggregators and electronic word of mouth.


**Figure 3.** ***Business opportunities in journalism (Downes, 2009).***

### 2.5.2. The search for a new business model

Osterwalder (2013) embraces the dynamics beneath business modelling through a metaphor of theatre in the sense that front stage is what people are interested in and it is what they are willing to pay for. More specifically, drawing from Osterwalder (2013) a business model in journalism has a front stage (which leads to revenues) and a backstage (which makes up for the costs). In this sense, we indicate that if stakeholders in journalism succeed in putting on a show and attracting audiences, this successful business opportunity exploitation will eventually lead to business models and profits. This ability to put on a show is vital especially in the digital space, where the ability to draw attention through evoking emotions is the key to attracting real audiences. This is in line with Kremers (2013), who highlights: "'Trigger an emotion and your content gets shared and retweeted". In this sense, as electronic word of mouth is best driven by triggered emotions (Kremers, 2013), stakeholders in future journalism need to seek novel innovative ways to enhance the media consumption experience in order to connect with audiences.

However, it is not an easy task to monetize value. This is a consequence of the complex and sometimes even chaotic conditions and interactions in contemporary journalism, where value is created by various stakeholders; especially also today, where the freemium business model seems to be the default business model on the web. However, as noted previously, new business models are developing. There are at least two different types of start-up driven business models that can be distinguished in journalism. While the storytelling models highlight original high quality content (news and stories) for audiences in value creation, the service-oriented business models focus on carving out new functionality without trying to monetize the journalistic content. In this sense, it is also vital to shed light on the value creation mechanisms of more established players such as Google, that combine elements from both storytelling and service-oriented business models while launching Newsstand, a Flipboard-style reading app for android with support for subscription walls for newspapers and magazines. Moreover, there are also other novel business models in the pipeline. For example writers turn to crowd-funding to develop stories and thus utilize crowd-funding service providers, such as Kickstarter, Indiegogo and Spot.us, for donations. Publishers turn to crowd-sourcing to generate the quality content to be published on their websites (Gunelius, 2013) and utilize websites such as Freelancer.com, which enables them to create a submitting contest for freelancers.

In light of the above, it is reasonable to suggest that business models such as philanthropy, donations and pre-revenue model will gain significance in the future. Moreover, according to Phillips (2013) the future of journalism is not about finding ways of doing away with journalists and journalism, or about undermining the quality of what journalists should do, rather than finding new ways to get citizens not only to participate but also to pay for the journalism we all need. As Sirkkunen and Cook (2012) highlight: ".. there is no single, one-size-fits-all solution but each news provider has to rely on a combination of revenue sources in order to grapple with fragmented

media markets, social connectivity and the internationalization of news production." In this sense, successful business modelling in journalism requires a creative mind set and courage to do things differently. As web 4.0 will introduce personal agents and fine-tuned distributed search around 2020-2030 (Spivack, 2007), unforeseen intelligent features such as highly personalized articles and recommendations and other innovative ideas may emerge. As the speed at which developments occur are somewhat unexpected, it is possible that shifts in journalistic value creation have already happened behind the scenes resulting in new business models we cannot even imagine yet.

## 3. Participatory Journalism Case Studies

In this section we illustrate how participatory journalism is implemented, executed and practiced on the basis of several cases. We have examined the cases based on a similar "criteria" as Deuze et al. (2007). The viewpoints for this evaluation were: 1) the roles of the user participants and the professionals; 2) the motivation of the both parties; and 3) the success or outcome of the business model. We have also considered how the concept might work under different circumstances.

Based on the case analyses, we intend to identify a number of trends that are radical enough to shape the future of journalism.

**Case A: Oma Olivia**

Olivia is a Finnish women's magazine. The concept of Oma Olivia (My Olivia) is to give the readers the possibility to participate in making the magazine. The co-creation process is composed of various challenges that involve readers' output. Readers can choose, for instance, between angles for stories, a few interviewees or photos from the shooting session. The process of reader participation takes place on an online platform which was built specifically for that purpose.

The co-creation concept of Oma Olivia is not completely open; readers have predefined possibilities from where to choose but the professional journalists make the ultimate decisions and the writing / visualizing part of the final journalistic pieces. The motivation to collaborate is based on free will, but the "participating journalists" are awarded with different titles based on their participation level (e.g. assistant to editor-in-chief) (Bartlett, 2013). According to Aitamurto (2013), readers' thoughts of the co-creation process were conflicting. Co-creating readers experienced that the magazine felt closer to them and a sense of a community was built around them. On the contrary, readers that were not participating in the making of the magazine felt as outsiders when reading the specific co-created issue.

During and after the first co-created issue the professional journalists' views about inviting readers to the journalistic process were negative. They experienced that they had been forced to give their magazine concept and the journalistic decision making in the hands of amateur readers that could not possibly know what the core of the

magazine is. They were scared that the readers would ruin the magazine (Aitamurto, 2013). At the same time, after the first co-created issue, readers wanted to participate more (Bartlett, 2013).

Currently many of the co-creation challenges are sponsored by the magazine's advertisers and published not as journalistic content but as advertorials (Bartlett, 2013). For example, Alpro (a grocery company) is sponsoring a food challenge where the readers may first decide the theme and later on they can post their own recipes with photographs, and finally vote for the best recipe.

The aim of the co-creation process was, and still is, to engage the magazine's readers with the magazine and in making the magazine more. According to the CEO of Bonnier Publications the co-creation is also a selling point and the collaborative issue sells better than a "normal" issue (Bartlett, 2013). Oma Olivia started 2010, and at the moment the fourth co-created issue is under production. In the future, it is interesting to see whether the editorial staff will provide more space for amateur readers to collaborate, even if it requires more resources.

**Case B: Scoopinion**

Scoopinion is a news-reading start-up based in Finland. Their service provides tracking of reading behaviour after users install a browser plugin. Users may sign up directly to the Scoopinion site or through Facebook. On the Scoopinion site, readers then get recommendations of popular news based on the start-ups' proprietary algorithm. It takes into account users' own reading habits and those of their friends. Thus, Scoopinion represents a novel type of a socially mediated and crowd-sourced distribution channel for journalistic content. It distinguishes itself from other types of distribution channels (for example, news feeds) by focusing more on the content and far away from the sole clicks, thus aiming to provide a personal magazine for each user.

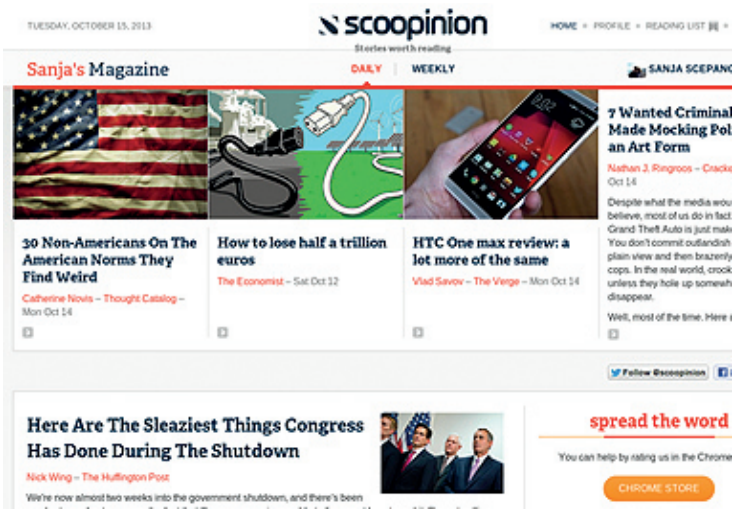


**Figure 5.** ***Scoopinion's homepage.***

Users' role in the case of Scoopinion is passive. While they read news stories on whitelisted sites, Scoopinion tracks and collects data about their behaviour: how long, up to what percent they read the article, at what time of the day etc. The collection of all such user data provides a database against which Scoopinion runs its algorithms. Even though the users do not interact with the journalists directly, based on the database, the journalists get valuable insights about how their content is being read. They can, for example, see at which point in their article the drop off in reading happens, and learn how to improve and adapt their writing practice. The role of professionals is not changed prior to their articles being distributed through Scoopinion. However, as we note above, the valuable insights about reading their content has potential to cause professionals to adapt their journalistic practice to user demands later.

Readers, i.e., the users of Scoopinion, are motivated to find the content that matches their personal taste best in the sea of online news. Since Scoopinion is only distributing the online content from news sites, its lack of business connection to the professional houses might be one of the reasons of its slow growth. Professionals are motivated to find out about readers perception of their content and so connecting with them directly might be one viable business strategy for Scoopinion.

Scoopinion is still in a start-up phase, having a relatively small number of active users. It has potential to grow to a larger crowd-curated online magazine thanks to its unique dataset that provides novel reading behaviour information. The suggestion that we make for Scoopinion to connect with professional news houses could be realized directly by offering high-quality statistics and analytics on reading behaviour and attitudes toward news content. A possible disadvantage is that many news providers already track the reading behaviour of their readers themselves by increasingly offering/requiring a sign-up on their sites (often through Facebook).

If we think about numerous recommendation systems online that are implemented by different companies and in diverse fields, the idea of Scoopinion – to track user behaviour data and recommend news content – is not novel; rather, we can say it comes to the journalism context from existing ideas and the models outside. However, in our opinion, such a technology has not yet become popular among larger audiences for reasons that it is still emerging or finding the right form. However, it will likely have significant impact in the near future to support journalistic relevance, a trend that we identify and discuss more under the discussion on trends.

**Case C: Scoopshot**

Scoopshot helps consumers and photographers to reach image buyers in a new way. The idea is to make it easy for photo buyers to acquire unique photos and videos and reward the photographers for their best photos. It is a crowd-sourcing service for sharing eyewitness photos and videos, for example.

If a person has a photo on something interesting and topical, s/he can share it on Scoopshot that takes care of the distribution. It is by far a simpler approach compared to personally distributing a photo to all major local media companies and wishing to

be rewarded. A large number of media companies are using Scoopshot as a source for photos including Metro International, the Daily Star, and MTV3 Finland to name a few. To minimize the threat of using altered or stolen photos Scoopshot assesses an image's authenticity to minimize risk for media companies.

Users are providers of photo and video content. They interact with professionals by uploading their content to the Scoopshot service that distributes the content to professionals. The content is added to tasks like "Fiat photos" or local news that creates the context for the content.

Professionals use the content according to their own discretion. Sometimes amateur content can be the only content there is available and it must be used. Sometimes there can be multiple sources for the content and the professional can choose the one s/he favours the most. If content is selected to be used, the professional pays for the use and the creator gets rewarded, so there are no conflicts.

The motivations for users to provide content are at least excitement and money. According to Scoopshot "64% of readers stated that initiatives by newspapers to encourage readers to send in photos made newspapers appear more modern and innovative". Additional monetary rewards from good photos can be significant. The highest recorded earning has been around 20 000 USD.

The number of Scoopshot users (amateurs) and media companies using the service is increasing all the time. The service was published early 2013 and it claims to have over 300 000 mobile photographers and 60 media companies using the service.

Scoopshot does one thing extremely well: it creates a single channel from one user to many media companies. But there can numerous users, so the number of the connections from one many media companies to many users is likely to be great. It is a prime example of creating a single channel between amateurs and professionals for two important modalities of content in journalism: photos and videos. This eases users' participation in journalistic content production, and similar one-to-many models would be applicable in other areas of journalism as well.

**Case D: Pearltrees**

Pearltree (est. 2007), the visual and collective library lets users organize and bookmark information, for example digital journalism, in tree-like structures. This collaborative curation tool allows users to collect, organize and share any URL they find online as well as to upload personal notes and photos. Users can synchronize their accounts with Twitter and Facebook and embed a pearltree into most CMS products including Wordpress blogs, Drupal websites, Typepad blogs and others. Pearltrees has moderate momentum, around 350.000 users.

**Figure 6.** ***Pearltree iPhone and iPad screenshots.***

Users are free to utilize any URL online (Youtube, Forbes, Soundcloud, blogs) as well as their personal sources such as photos, notes and videos as a pearl. Users cultivate their interests through combining single pearls into pearltrees, which highlight the chosen topic. Thus, users are able to frame and make sense of information they find attractive and worth sharing through Pearltree visualization. In addition users are able to decide whether they want to keep their pearltrees private or share them with the world.

Pearltrees welcomes everyone to create their pearltrees and cultivate their interests. Thus, in general, Pearltrees does not distinguish hobbyists from professional journalists. Moreover, in many cases pearltrees include both non-professional user-generated sources and professional journalist-generated sources.

The motivation of participants derives mostly from the basic human need to share content (Chakravarthy, 2011). This need to share is embraced in large scale especially in those cases, when pearltrees are open and accessible to the world. However, since people sometimes want to have control over their audiences, it occasionally may be more lucrative for them to choose their pearltrees to be private and share their views only with selected smaller audiences.

Pearltree is a pre-revenue company that, to date, has secured 12.2 million dollars in Angel and Venture funding in four separate rounds. In the future, privacy features will be introduced as an aspect of their monetization strategy. However, these things take time and therefore it is too early to evaluate whether this project is a success or not. Moreover, the definition of success is also a discussion of its own, since for some digital entrepreneurs the key driver is the ability to enable free expression.

**Case E: WikiLeaks and Similar Platforms**

Wikileaks defines itself as a non-profit media organization that was launched officially in 2007 (Wikileaks, 2013). This organization has attracted a large amount of attention from other media organizations and governments because it continuously publishes confidential information (thus disclosing the information illegally) such as secret diplomatic cables and secret war logs (Bruns, 2012; Hood, 2011) in news and raw form while maintaining the anonymity of its sources. The organization operates in strict secrecy given no names of their staff except for Julian Assange and Kristinn

Hrafnsson, and also provides high anonymity to its sources by the use of an advanced system of data encryption. What is interesting about Wikileaks is not what it is but what it does, and how it relates to traditional media players. What Wikileaks does and the effects and echoes of their actions is what we call the Wikileaks phenomenon.

The Wikileaks phenomenon has had large media success partly because it operated in direct partnership with major media organizations such as The Guardian, The New York Times, Der Spiegel, Le Monde and El País, also because its media spokesman Julian Assange is under legal prosecution.

Specifically for the Wikileaks site, user participation in the form of information sourcing is active but highly anonymized. However, users cannot edit the news or data once it is published. On the other hand, the leaked information is available to users and they can use the archives and do research using this information.

Professional journalists have an important role in the Wikileaks phenomenon because they filter the disclosed information, process it and present it in a format friendly to their public e.g. they present news related to their own countries and in their own language. Professional journalists benefit from the Wikileaks phenomenon because they can capitalize from it.

Wikileaks as an institution has altruistic motivations as can be inferred from its non-profit status. We can also infer that whistle-blowers (people sourcing the confidential information) share similar motivations as Wikileaks. Thus, the motivation of participation is very high; however, the risks of being labeled or identified as an outlaw by some countries are also high. Ordinary readers are motivated by their curiosity and their wish to be informed, and this motivation is pervasive and will be never fulfilled entirely.

The success or failure of the project is difficult to measure because there is not a clear indicator, e.g. money, involved. However, we can still make some inferences based on the available literature. Wikileaks as a non-governmental organization (NGO) may disappear. However, some authors, e.g. Hood (2011), hold that the Wikileaks phenomenon is here to stay and it will have a profound effect on the culture of transparency of governments and in global governability. The phenomenon is also perceived as successful because it generates important conversation, the anger of governments and also movies.

Many elements that Wikileaks uses are not novel; the leak of confidential information has always been present in societies. The novelty is in the amount of leaked information. Also, established news institutions have incremented the impact of leaked information by adding context and digesting the information for their audiences.

**Case F: Instagram**

Instagram is a social network based on photo and video sharing. In Instagram, users can upload photos and videos that can be later shared to other social networks such as Facebook or Twitter. This service provides users a tool to apply digital filters to the uploaded items.


**Figure 7.** ***Instagram's logo.***

The role of users is to upload the items they want to share with the public, specifically videos and photos. There is no interaction with professionals. In this service, users cannot distinguish between a professional or a non-professional creation. Instagram is as user-centric as every social media. Instagram is an exceptional platform for advertising a brand. Even if professional journalists have not a specific role, professionals from many companies are using Instagram to increase their value and consideration among investors. Companies are able to attract job applications and stakeholders with the use of hashtags, posting photos and videos. While there is no immediate revenue in terms of money for a company, there is an earning in terms of value and image of a brand itself.

The intrinsic motivation of people to use Instagram is mainly the interest in sharing their lives or sharing their passion for photography. There are also external motivations for companies, which are to use Instagram to increase the popularity and the value of a company's brand. The service is successful: the monthly active users are about 150 millions. Though, the analysis has revealed that Instagram is not a relevant platform with respect to conflicts between professional journalists and amateurs.

**Case G: Tripadvisor**

TripAdvisor was an early adopter of user-generated content. It is an online travel service that provides directory information and reviews of hotels, restaurants, attractions etc. in different destinations provided by mainly the users of the service. Users can search for this information and leave their reviews and comments on the place they have visited. The reviews typically include a rating from zero to five, any written feedback and additionally photos. In addition to the directory information and user-generated content, it provides an interactive travel forum for users to ask detailed questions on whatever they wish. The service is free for the users. Advertising is the underlying business model.

Based on user-generated content, TripAdvisor produces different kinds of publications. The most well-known publications are Travel guides and Travelers' choice (see

Figure 8). Travel Guides are electronic guides to cities, such as Helsinki, or trip types, such as a family or a bargain trip. They provide information about hotels, restaurants and attractions in a particular destination. Travelers' choices introduce the best hotels, destinations, restaurants and beaches around the world. These publications are not as extensive as similar travel guides, but they are very up-to-date, based on the information from TripAdvisor services.


**Figure 8.** ***Examples of free TripAdvisor publications.***

TripAdvisor is an example where crowds have been able to produce more up-to-date information about any destination compared to any printed professional travel guides. TripAdvisor guides are not as professional as commercial guides, but they are up-to-date and free. TripAdvisor publications are automatically generated documents. Professional journalists are not producing these publications, but can search information from TripAdvisor for their articles.

Users are not paid for their contribution, but they can earn badges based on the contributions they make. Additionally, top contributors are often active users of the service. They benefit from the reviews written by others and share their own reviews to help others.

In its factsheet, TripAdvisor claims to have over 260 million unique monthly visitors and over 125 million reviews covering more than 3.1 million accommodations, restaurants and attractions.

TripAdvisor has been able to create a very large travel directory covering the entire world. Currently it covers accommodations, restaurants and attractions. Similar models could be used for food, wine, music or other subjects.

# 4. Discussion

Predicting the forthcoming always includes a great deal of guesswork. In our approach, we are trying to predict trends shaping the future from the cases above. The chosen cases are radical enough to shape the future in some way. To increase the quality of our predictions, we challenged a few media professionals to comment our trends and to share their views on the future. Together with the trends and the feedback from the media professionals, we evaluated how crowds are changing journalism. It follows a discussion on the identified trends, then the reflection of them against the feedback from the professionals, and finally the description of our future predictions.

## 4.1. Trends

During the study process, we have identified trends that we believe will shape the future of journalism. Furthermore, we acknowledge that there are many other trends and predictions available in the literature and the internet. Our ideas are aligned with most of them.

**Relevance:** The amount of information is constantly increasing. We are already facing vast amounts of content available in Internet and it is not easy to find relevant content matching our personal interests. As the amount of information increases, we see that tools that help users successfully navigate this sea of content will significantly gain importance. At the same time, publishers and also journalists, face challenges in sorting out and curating the UGC. Navigating the sea of content is what we name the trend of relevance. Relevance means that a person will receive content that it is the most relevant based on her/his preferences. The preferences can be defined manually and information matching the relevance criteria will be shown. In the time of cloud computing and big data, data analytics is playing a significant role, and services that are able to provide the most relevant content are the ones likely to succeed.

Two of our cases, Scoopinion and Scoopshot, are dealing with the identified relevance trend. Scoopshot helps publishers to find relevant photo content among the crowd-sourced content. Scoopinion addresses the readers' need of personalized and timely relevant journalistic content.

**Sharing**: Scoopshot and WikiLeaks cases are both excellent examples of creating a "one-to-many" channel: any individual can use this channel to reach a great number of media companies or journalists to share something, whether it is a photo, a video, a gossip, a story, a research or pretty much any journalistic content. The effort required to reach professionals is very much less than finding appropriate magazines, appropriate contacts, finding contact information and contacting these people.

The case of Bradley Manning sharing confidential U.S. military information via a centralized channel is widely known example (Rothe & Steinmetz, 2013). The information to be shared does not need to be as rich & secret as it was in the Manning case (in fact, not a small number of magazines are reluctant to use such confidential information). Nevertheless, usually any content will be acceptable, as long as the sharing is easy and crowds find that the sharing meets some of their needs (money, reputation, etc.). The identity or hiding the identity of the sharer can play a central role in some cases.

**Community-created content**: Crowds are not just a random collection of individuals, but crowds are in fact a collection of communities, and thus content created by crowds can be seen as content created by (many yet distinct) communities. In addition, individuals can be part of many communities at the same time. As a trend, we want to emphasize the idea of communities creating content a bit more than the idea of crowds creating content. The reason behind this is that if a crowd has motivation to create a type of content, then this shared motivation is a base for the formation of a new community. Co-created content is also created for a target group, which it is likely to share motivations with the creator of the content, thus again there is an aspect of community. Early examples of online communities and their motivations can be explored in Butler (2007).

Oma Olivia is a good example of people creating content for people, in which the creators and audience feel part of a community. In TripAdvisor, many people feel that they are getting something in return, by submitting reviews to the community.

The idea of communities is also useful to explain engagement with a service. In the context of online interaction and co-creation, online services are successful if they find ways to motivate participation of users. In other words, users find a service useful if it satisfies their needs. For early online communities, some needs were identified in Butler (2007), for example the need for escape, visibility beyond their local work or geographical community, social interaction, self-esteem, future employment, as well as some sort of information, professional or economic payoff (Butler, 2007).

**Richer content will replace text**: Text will not be fully replaced by any other content, but the point approaches where text starts to complement richer formats instead of rich formats complementing text. Already 15 years ago, visual images have been said to replace text (Heller, 1996). The growth of services like Youtube and Instagram are examples of services where richer media is complemented by text, not the other way around. It has been estimated that 80-90% of consumer traffic will be video by 2017 (Cisco Visual Networking, 2013). On the other hand, there are also other richer content-driven digital services that complement existing text driven media. For example, Pearltrees allows users to frame and make sense of any type of information (text, drawings, photographs, videos, music) they find attractive and worth sharing. Pearltree's visualization allows users to collect, organize and share any URL (e.g. Forbes,

NYTimes, Youtube, Vimeo, etc.) they find online as well as to upload personal notes and photos. These tree-like content structures can be embedded into most content management systems including Wordpress blogs, Drupal websites and others.

**Mixture of professional and amateur content**: The amount of user-generated content is increasing. The quality of this content can vary greatly, but the amount of high quality UCG increases all the time. For example, not every blog will be a high quality one. But there will be professional blogs and amateur content that do not really differentiate quality-wise. This is the direction the traditional media will go. There is still room for high-quality content and curated content, but much of the professional content will be replaced by amateur content.

## 4.2. Feedback from Media Professionals

The analysis of the cases and identification of trends were one side in our process of predicting future. The other side were the interviews of media professionals. We presented our trends to a few media professionals, listened to their feedback and made final predictions based on the synthesis of these two.

**Fernando Herrera:** Fernando is ex-CEO for Rovio Entertainment and held several executive positions at Sanoma (the largest media company in Finland) corporation. Fernando agrees with most of the trends identified by us. In his opinion, community-created content is the most important, as organizing people for action and sort of a "community media desk" is something already needed. Regarding the pricing and content, he uses a saying: "the content in the future needs to be free or fabulous". Summarization of content, due to the high information load and mobile screens not suited for reading text is a necessity. Fernando also suggests automatic content writing for niche sport content, for instance. Finally, when it comes to the changes in online advertising, according to Fernando, we can talk about a new type of scarcity – video advertisements being shown during the journalistic video are limited in time.

**Tuomo Pietiläinen:** Tuomo is journalist working at Helsingin Sanomat, the largest subscription newspaper in Finland. Tuomo believes that community-created content will be the most important trend of the ones identified. None of the trends is obsolete, but some are more important than others. Relevance was found to be the least important trend to him. Tuomo also believed in displays that can be folded into a pocket and are connected and interactive. This implies the development of appropriate technology that enables, shapes, and then drives such a future.

## 4.3. Future Predictions

Based on the identified trends and the feedback from professionals, we make the following predictions. The question "How will crowds change journalism?" will have many answers and these predictions will definitely play a partial answer to the entire question. However, the predictions that we make are:

1. Participatory journalism and traditional journalism will be more integrated. One significant driver for this is that the volume of user-generated content will increase; it is cheap, up-to-date and engages the audiences. To capture this opportunity, journalists will utilize more tools (such as one-to-many channels) from participatory journalism and the professional and amateur content will be more mixed in the future. We expect that those journalists who can adopt these tools will be likely the most successful ones in the future.
2. Content, in general, will be free. User-generated content and automated content creation will help reducing the effort of content production from journalists. However, high-quality and well-curated (relevant) content will have markets and this might change the role of journalists. UCG and automated content creation will reduce the number of content creators. We expect the number of journalists to decrease, and their tasks to be more focused on the curation and production of high-quality content. We believe that services that can automatically provide the most relevant content are the ones to succeed in the future.
3. Content is changing its form. Text used to be the dominant content form of journalism, but richer formats will be replacing it. The future journalism will integrate various different media formats. The written text will not vanish from journalism, but its role will change from a dominating one to a supporting one instead.
4. Innovation in digital journalism is, at least partly, driven by technology evolution. The development of display technology will change the consumption together with the development of automatic content generation and personal news assistants. Personal agents and fine-tuned distributed search are to be introduced around 2020-2030 (Spivack, 2007). These developments may result in unforeseen intelligent features such as highly personalized articles and recommendations and other innovative ideas. Comparing this with foldable electronic newspapers, "Google-glasses"-like displays or wearables, will likely create entirely new ecosystem(s). Together with such technology, and interactive content availability, we expect to witness in the near future, a personal news-assistant, possibly in a form of a robot.

An illustration of a few of these predictions is shown in Figure 9. The figure illustrates that as the volume of content increases, so does the volume of the integrated journalistic content (co-created by crowds and journalists). The volume of purely

journalistic produced content will decrease over time. It is likely that in the future we will still talk about professional journalism, however, in coexistence with amateur journalistic content, complementing each other.

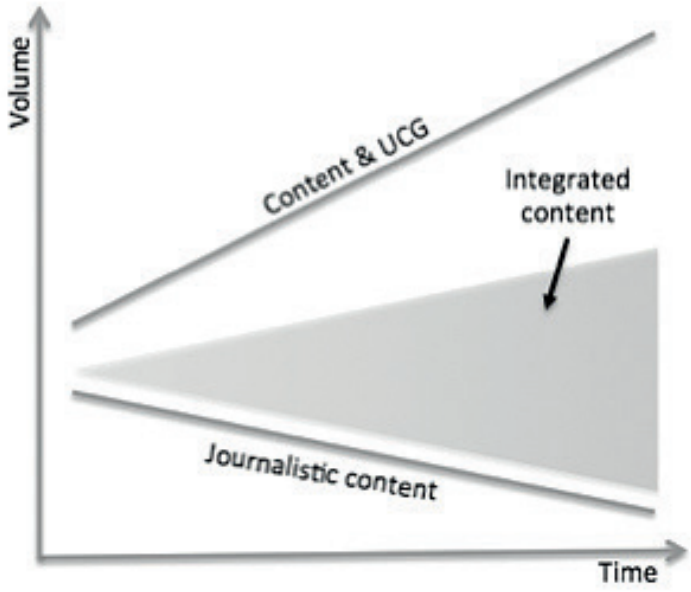


**Figure 9.** ***Future predictions.***

At the moment, we are at the dawn of participatory journalism. Once people get more familiar with new technologies supporting participatory journalism, the volume, the quality and the consumption of participatory journalism will increase. Journalists will still have an important position in the field of journalism, but the power of crowds will increase.

## 5. Conclusion

We presented an overview of the current state in the changing field of journalism and identified the most important trends driving these changes in near the future. Our understanding of the current journalistic situation is based on literature review and on our example cases. Among many real examples of start-ups or new technologies that have emerged to satisfy the need of novel ideas in the journalistic content production process, we chose six diverse and representative cases. The cases we discussed were: Scoopshot, Scoopinion, Oma Olivia, Pearltrees, WikiLeaks, Instagram and TripAdvisor. Each of the cases provides a good example for one or multiple of

the important journalistic trends that we identified: relevance, sharing, community-created content, a tendency towards mixture of professional and amateur content, as well as richer content types complementing text. After our own discussion on the relevant trends, we interviewed media professionals to obtain both their feedback on the identified trends and their own suggestions. The result is that the professionals agree with most of the discussion and our trends, with the addition of a few more ideas of possible additional trends: summarisation, scarcity, and novel materials that will replace paper as a journalistic medium.

Finally, we would like to point out that technology needs to become commonplace and almost boring before people will start using it creatively. We think that novel technologies are already in place when it comes to journalism, and that it will take only a shortly time until both readers and publishers will start using it in innovative, radically different, and creative ways continuously shaping journalism in the future.

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# Television's Next Top Business Model: Personalized and Pervasive

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**Abstract.** In this paper, we study future business models of video content aggregators focusing on professional scripted entertainment. Recent technological changes and widespread adoption of the broadband Internet and media-capable mobile devices is

rapidly changing the landscape of content aggregation. Traditional players, such as TV broadcasters, are losing ground to the newer, more agile market players with business models, which answer better to the demands of the contemporary customers. We review existing business models, studying successful companies, both traditional and new market players. We analyze strong and weak sides of each model, collecting the best practices. In the second part of the paper, we go through different stakeholders related to video content aggregators and their demands. In the concluding sections we summarize the findings from the literature and combine this knowledge with empirical findings from qualitative interviews conducted with experts from the field.

**Keywords:** video content aggregation, Internet, future of TV, business models

## 1. Introduction

Traditional broadcast television is more popular today than ever before. According to a recent report, people watch television on average five hours per day in the United States (The Nielsen Company, 2013). While new technologies, such as time shifting and digital video recorders, DVRs, have decreased the time spent watching live television, the total time spent watching broadcast television is still on the rise. People also are spending more money than ever on entertainment, and in particular on TV subscriptions. From 2000 to 2010 consumer expenditures on entertainment media grew 69 percent in the U.S. and Europe, and during the same time period revenue from cable and satellite TV services grew 148 percent (Advanced Television, 2011). Even though the traditional video content aggregation business, the television industry, seems to be doing well, it is facing large changes in the future.

Television has been the dominant entertainment device for half a century. By the mid-1950's television started to gain a foothold as a distribution channel for movies. In addition to public television, commercial television with commercials paid by the advertisers was rapidly expanding. Television created a new opportunity for viewers: instead of going out to theatres, they could view the movies in the comfort of their own homes, free of charge. However, the program selection of the few TV channels was limited, and the viewers had to watch commercials on commercial channels. Technological progress led to cable and satellite broadcasting, which significantly increased the number of available channels. Cable and satellite television also enabled the subscription model, where the television viewer pays a recurring fee in exchange for the service.

In the past few years, broadband Internet connections capable of delivering high quality video content have become available to the public. The high bandwidth, low cost, fixed, and mobile connections and a huge selection of multipurpose end devices make its use more attractive to viewers. Companies from the television industry, such as NBC, from the video rental industry, like Netflix, and completely new players, like

YouTube, are offering video content aggregation services on the Internet. Internet use in general is also more widespread than ever. Of particular interest however is what people do on the Internet. In 2008, young adults spent 30 percent of their Internet time watching videos (The Nielsen Company, 2008). In 2012, the same number for kids and teenagers was over 60 percent (The Nielsen Company, 2013).

The current development towards increased consumption of online video can be considered as a threat to the traditional television businesses, but it is also a huge opportunity if people realize the potential of such videos. D'Arma (2011) studied the impact of Internet distribution on television business. The author emphasized that the traditional television businesses own the majority of the online video aggregators and that they benefit from their established content creation activities. The strategic importance of content creation activities and licensing intellectual property will increase. He also found two increasingly different logics based on content shelf life: content with short shelf life, such as sports and news, and content with long shelf life, such as scripted drama series. People view short shelf life content during a short time period after its release; the traditional television is quite well suited for this type of content.

Even though the threats are not imminent, understanding the changes in video content aggregation is vital for traditional television businesses that want to exploit the new opportunities and expand their business. Companies who want to enter the aggregation business should understand also the different parties' needs. In our study, we focus on content aggregation of professional scripted video entertainment, i.e., content with a long shelf life. Our premise is that the Internet will be the dominant distribution channel because of the possibilities it provides. In addition, we exclude the operators from our analysis, as we predict that their role will not be significant in future business models. By analyzing the needs of the viewers, advertisers, and content creators, we discover what the aggregators need to take into account in order to survive in the Internet-based aggregation business of the future. We argue that video content aggregators need to personalize their service to viewers, provide data to advertisers and content creators, and adapt their service to changes in content creation and content itself.

The rest of the chapter is structured as follows. In section 2, we examine the currently dominant business models in video content aggregation by examples. Section 3 deals with the value that the aggregators offer to fill the needs of advertisers, content creators and viewers. In section 4, we discuss our findings and compare them to industry opinions gathered from interviews. We also highlight the key factors that will affect the success of a business model in the future. Finally, section 5 concludes our chapter with implications to the stakeholders in video content aggregation industry.

# 2. Business Models and Its Components

The business of video content aggregation has been relatively stable for decades. While competition was always high and technological advances such as cable TV, satellite TV, VHS and later DVD players did upset the balance occasionally, good old TV business remained largely unchanged. However, as the new millennium arrived, something happened: the Internet started to change the world. Recent advances in fast broadband Internet connection and end-user devices made delivery of video content through a network connection a viable option (D'Arma, 2011). Two-way interaction changed the roles: Previously passive viewers became active in choosing content and how to pay for it.

The Internet was referred to as "disruptive" in the context of media business already in the early 2000's. Economic impacts of the new technology were predicted to capture the whole value chain of video content creation and distribution (Zhu, 2001). Such big disruption spawned a variety of new business models of content aggregation and seriously challenged existing market players. However, the winner in this battle of business models is far from decided. In this section we look at currently dominant business models on the market by reviewing prominent cases of concrete companies and draw comparison between their methods of content delivery, revenue model and the ecosystem around them.

## 2.1. Value Networks

We use the Value Network Analysis (VNA) (Allee 2002) modelling technique to analyze the business models of different content aggregators. The value network consists of roles, which are represented as nodes and flows of transactions represented by arrows between the nodes. First, we show the tangible flows, which are products and/or services from supplier to customer, and respective flows of money from customer to supplier. Later in the chapter, we also add the intangible flows, which represent other values in addition to monetary value.

In value networks from video content creation to viewing it we can see several roles and players. The 'content creators' create video content. They are film and TV production companies, advertisement makers who carry out the creative part of making content. Often the 'content producers' are connected to the same role; they carry out the economical part of making content. Then the 'content aggregators' collect the video content from creators and make it available to the viewers, often accompanied with commercial spots from the 'advertisers'. 'Content viewers' then select the content from available choices for viewing.

## 2.2. Revenue Models

Revenue models explain how the viewers are charged for the services that are needed to view the content. There can be separate charges for distribution channel and actual content. Sometimes they are bundled in innovative ways. In the delivery of video content from the content creators to content viewers, we can see two revenue models: 'supply chains' and 'multisided markets'.

'Supply chains' are the traditional form of markets. They consist of seller and buyer roles, where the buyer purchases products or services from the seller and pays for them. An example of a supply chain is filmmaker – movie publisher – movie retailer/rental company – viewer, presented in Fig. 1.

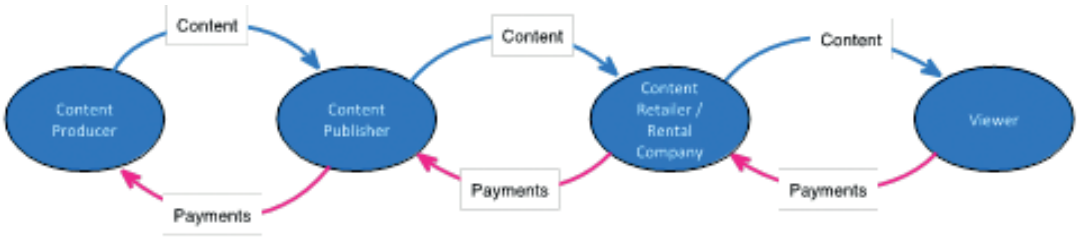


**Fig. 1.** ***Supply Chain Value Network***

Two-sided or multisided markets have sellers and buyers but also a third role, 'business platform', which enables two distinct but related groups of customers to interact with each other. The platform serves all groups, usually charging one a premium price for the service, while subsidizing the other. The side paying the premium is willing to do so because it needs access to the subsidized side and is interested in growth on the platform. The subsidized side is willing to use the service and contribute to the goals of the other side in order to get a product or service for a very low price or for free (Eisenmann, Parker and Van Alstyne, 2006). An example of a business platform is a commercial TV company. It has two sides; one is the advertisers who pay for the advertisement spots and the other side is the viewer who, in exchange for watching those advertisements, gets content for free (see Fig. 2).

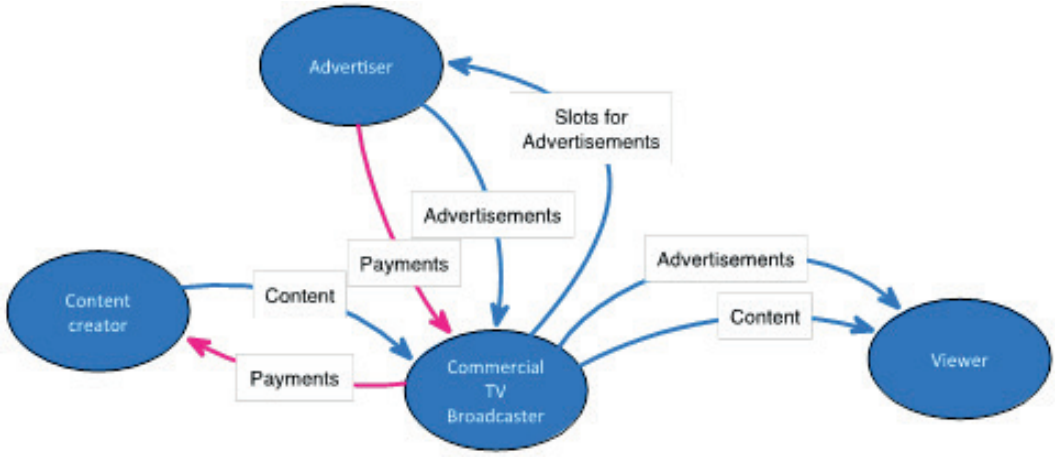


*Fig. 2. Commercial TV as Two-sided Business Platform*

## 2.3. Traditional Commercial TV: NBC

The National Broadcasting Company (NBC) is an American commercial broadcast television and radio network. It started transmission of radio programs in 1926 and television in 1939. NBC was initially owned by the Radio Corporation of America (RCA), which was manufacturing radio and TV receivers and transmitters and was also operating broadcasting stations. There was a clear need to offer content to create the need for the consumers to buy radio receivers. Also very early the advertisement-funded business model was born. NBC also bought content from other creators like moviemakers. Thus, NBC frequently combined the roles of content creator and content aggregator. During the next sixty years, the content offered by NBC and in similar models by its main competitors CBS, ABC and Fox consisted of TV shows, sports, news and TV series.

Today the company is known as NBCUniversal. It is one of the world's leading media and entertainment companies. They have four business segments: Cable Networks, Broadcast Television, Filmed Entertainment and Theme Parks. The number of subscribers to their most successful cable networks in the U.S. was approximately 100 million at the end of 2011 (NBCUniversalMedia, 2011). They operate a local television station network, which collectively reaches approximately 31 million households representing close to 27 percent of all U.S. television households. Their filmed entertainment segment consists of Universal Pictures, which produces, acquires, markets and distributes filmed entertainment in various formats worldwide. Their total revenues in 2011 was around $20 billion.

### 2.3.1. Content Delivery

The main delivery channel of NBC is a nationwide network of terrestrial broadcasting stations and cable TV broadcasting under other brands like CNBC. Today NBC and other traditional broadcasting companies also offer most of their video shows through the Internet, however, only in the U.S. and a day after the television broadcast.

### 2.3.2. Revenue Model

NBC business segments have several sources of revenue. Fig. 3 provides the structure of their TV business. Cable Networks collect revenues from (1) the fees they charge from the subscribers of their cable networks and were generated from distribution agreements with multichannel video providers ($4 billion), (2) the sale of advertisement time on their cable networks ($3 billion) and (3) licensing and sale of their own programming ($0.7 billion).

Broadcast Television collected revenues from (1) the sale of advertisement time in their broadcast networks ($4 billion), (2) content licensing ($1.5 billion) and (3) other revenue ($0.5 billion) like distribution revenue associated with 2010 Vancouver Olympics. Beyond this, NBC has revenues from film production and theme parks.

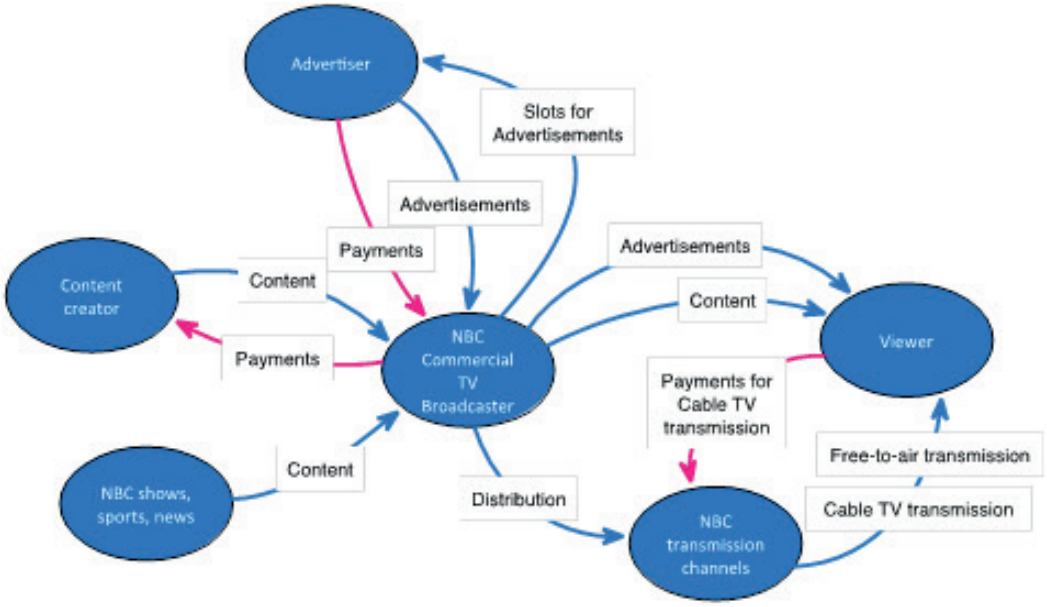


**Fig. 3.** ***NBC, Traditional Commercial TV Business Model***

### 2.3.3. Discussion

NBC traditional TV is a classic example of an advertisement-funded business model. It has been the dominant business model since the early days of radio and television broadcasting. Its strengths are that it is easy for all parties to be successful: advertisers, viewers and broadcasters. It is also cost-effective for brands with a large number of

potential buyers. Recently this traditional model has been challenged strongly by innovations in technology, which enable the advertisers to target their message to more potential receivers and to measure the effectiveness of their ads better than before. In addition, on the other side, the viewers can choose to look at programs with less or even no ads at all.

## 2.4. Subscription: HBO

Home Box Office (HBO) is an example of a subscription-based business model. HBO, a subsidiary of Time Warner Inc., is an American premium cable and satellite television network. The company started initially in the 1970's as a distributor using cable TV networks and soon expanded into satellite broadcasting business. In the 1980's, they also started to produce their own content, which during the 1990's became very popular and earned numerous nominations and awards. Their business model is based on viewer subscriptions.

### 2.4.1. Content Delivery

HBO started as a cable TV and satellite TV distributor. Since then the creation of original programs has become more important. They license their content for distribution over other cable TV and satellite TV broadcasts and free-to-air distribution in many countries. HBO's programming reaches approximately 30 million paying TV subscribers in the U.S. (September 2012) and, in addition to U.S. HBO broadcasts, in at least sixty countries covering about 114 million subscribers worldwide (TimeWarner, 2012).

### 2.4.2. Revenue Model

HBO's revenues are generated through the fees that Multiple System Operators (MSOs, cable/satellite operators) pay per subscriber per month. HBO does not make money on advertising. HBO does make money in licensing its programs in other countries (Forbes, 2012). HBO's main customers are the MSOs who in turn deliver video feeds to the viewers, as part of the bundled service that includes pay TV, Internet and phone services. The model of the HBO is given in Fig. 4.

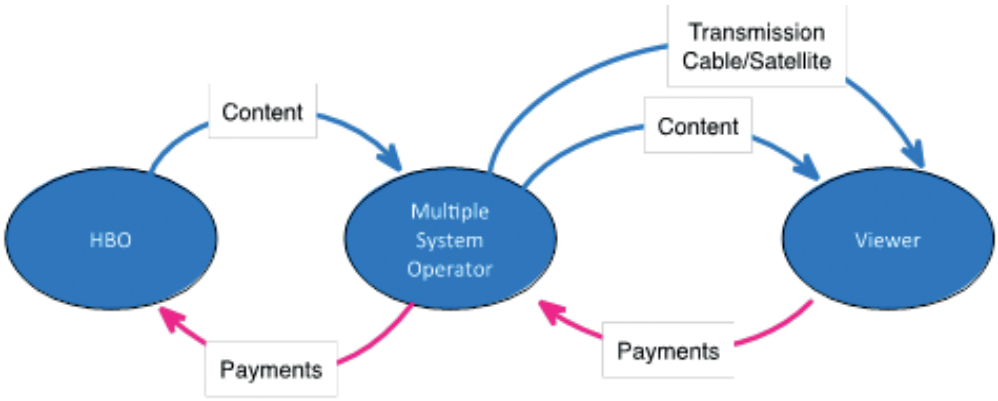


**Fig. 4.** ***HBO Business Model***

#### 2.4.3. Discussion

The business model of HBO is based on delivering quality content to viewers through cable TV operators. Typically, the viewers buy a bundle of channels with the pay TV subscription package from the cable TV operators. Therefore, cable TV operators are helping HBO greatly to sell to viewers. On the other hand, over the top (OTT) content aggregators like Netflix deliver content directly to the viewers using the Internet and bypassing cable TV packages. We predict that the operators' role will diminish and that OTT will be the dominant content delivery method.

### 2.5. Open Online Video Platform: YouTube

YouTube, a video-sharing website was founded in early 2005 (YouTube, 2013a) by three ex-PayPal employees (Artero, 2010) and was acquired by Google a year later (Associated Press, 2006). The idea leading to the creation of the service was to allow Internet users to upload, share, and watch short online videos easily. YouTube was not the first website to offer such services, and there was substantial competition on the market, including Google's own Google Video service. However, an easy user interface and ability to instantly share new submissions made YouTube stand out to its advantage (Graham, 2005).

YouTube grew impressively: the service posted approximately 3 billion short videos in 2006 (Hopkins, 2006), today 6 billion hours of video is watched per year (YouTube, 2013b). YouTube also attracts more than 1 billion unique visitors per month (YouTube, 2013b), making youtube.com one of the most visited websites on the Internet. The success of YouTube lies also with how users interact with it and how the revenue model is constructed around the vast ecosystem of complementary Web services on the Internet. In many respects, YouTube is the true child of the era of a social Web. YouTube fits perfectly the criteria of Web 2.0 defined by Tim O'Reilly

(2005): it is purely an Internet service, co-created together with its users, giving users a freedom to customize their use and experience.

### 2.5.1. Content Delivery

From the beginning, YouTube stood out in terms of revolutionizing content distribution among users. Google recognized the potential of mobile video early on by including the YouTube application with the first generation of Apple's iPhone in 2007 (Artero, 2010) when the smartphone phenomenon was only emerging.

Today YouTube is available on most devices connected to the Internet including PCs, various smartphones, tablet computers, TV sets and gaming consoles. Finamore, Mellia and Munafò (2011) conducted a study to compare user behaviour across different devices confirming that viewers acted consistently on all devices. Such consistency helped YouTube to grow and paved the way for the steady generation of revenues discussed in 2.5.2.

### 2.5.2. Revenue Model

Right from the beginning YouTube relied on an ad-supported business model. The model utilizes a multisided market. Fig. 5 gives an overview of YouTube's business model and participating sides.

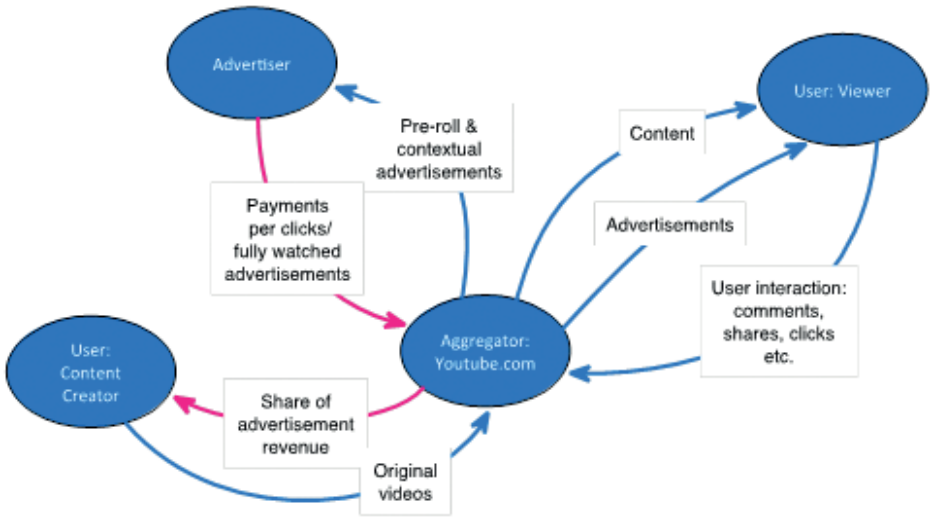


**Fig. 5.** ***YouTube's Business Model***

In the case of YouTube the subsidized side are the viewers and the paying side are the advertisers. The viewer receives the content available on YouTube for free; in exchange they encounter advertisements in the form of contextual text and pre-roll skippable video ads paid for by the advertiser. Skippable ads have been a successful

model for YouTube, where the user can skip the video just after five seconds, and in turn the advertiser pays only for video ads watched fully (Mehrotra, 2012). This is an attractive offer to the advertisers. The viewers are happy as they can choose to ignore ads that do not interest them.

Another party in this multisided market is the content creator. As mentioned previously the users largely create YouTube's content, yet professional video creators are a minority. YouTube offers a special arrangement – "YouTube Partnership Program" – to professional content creators. The arrangement gives the content creators extra features and a share of ad revenues in order to facilitate creation of more videos and attract new creators (YouTube, 2013c).

#### 2.5.3. Discussion

YouTube uses the Internet to distribute content easily to as many people as possible at their convenience. YouTube now also provides most of its content, which is uploaded by the users, for free, subsidizing it with advertisements. These two aspects ensured the wide success of the service, which make it by far the most popular video site on the Internet.

The sustainability of such a model can be questioned. YouTube manages to profit because of its enormous scale, near-monopoly in Internet video sharing and a tight integration with Google, which is a leading search engine in the Western world. It has to be noted also that the content on YouTube is very specific and does not include things like new movies, popular TV shows, or other expensive, copyrighted and popular content. Considering all these, it would be hard to imagine that exactly the same model would be applicable in the context of smaller markets or more expensive-to-produce content.

### 2.6. Online Subscription: Netflix

Netflix was founded in the United States in 1997 (Netflix, 2013) as a flat rate DVD-by-mail rental company. However, as DVD rental business declined, the company transformed itself largely into a video-on-demand, online streaming service by 2011 (Carr, 2013b). Today it has 37 million streaming subscribers in forty countries around the world, offering TV shows and movies in exchange for a flat-rate subscription fee (Netflix, 2013). While Netflix has built alliances with traditional market players such as cable television providers and movie studios, it is also their biggest competition. Netflix poses a direct threat to companies targeting TV viewers, as it offers the same type of content, with a big collection of on-demand series and movies, cross-device compatibility, affordable prices and an absence of advertising.

#### 2.6.1. Content Delivery

In terms of content delivery and customer interaction, Netflix acts more like traditional media channels than it does a social media one. Netflix also has full control of the content offered in particular areas and markets. The content offered usually

is licensed from original producers. Netflix tries to take on the market share of traditional players and cover all possible devices. Netflix can be streamed through the most popular Blu-ray players, Internet-connected TV-sets, streaming players, home theatres, game consoles, smartphones and tablets (Netflix, 2013).

### 2.6.2. Revenue Model

Unlike many new Internet-based companies which utilize multisided market models, Netflix is following a tried and true flat-rate subscription model (Fig. 6), very much like commercial cable TV. So far this model is a relative success: according to 10-K submission to the U.S. Securities and Exchange commission, Netflix had a revenue of $3.6 billion in 2012 (United States Securities and Exchange Commission, 2013); around one third of this comes from streaming services.

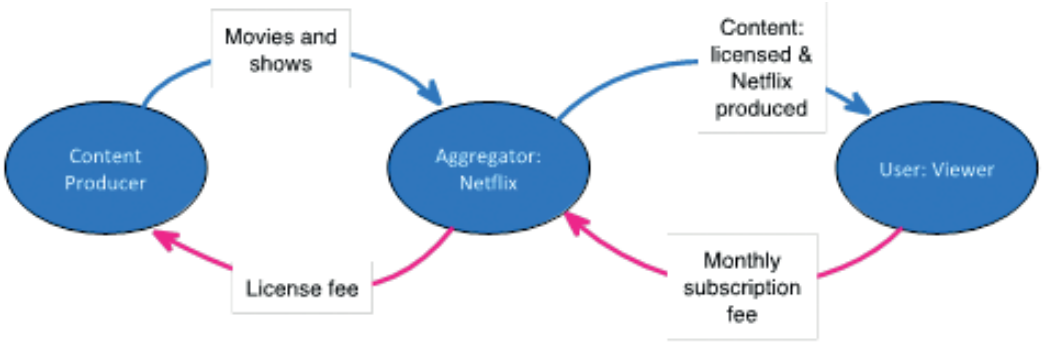


**Fig. 6.** ***Business Model of Netflix***

The major difference between Netflix and commercial cable TV channels is that the former offers video-on-demand streamed through the Internet, while the latter comes by means of TV cable in the form of a live broadcast. Netflix does not offer advertisements to its customers, and profits are based on subscription fees. The cost side of the model is mainly acquisition of licenses for the content as TV channels and movie studios charge Netflix for their content.

A new direction for Netflix is production of its own content. TV series exclusively licensed by the company have had considerable success and put Netflix on par with bigger players in the industry (Carr, 2013a). However, some observers of the industry have questioned the viability of this model. Kosha Gada of A.T. Kearney (Gada, 2013) questions the profitability of exclusive TV series if they are not licensed further to other content distributors. Currently, TV series produced by Netflix break even after two years, while an average subscriber of the service stays with it for twenty-five months (Gada, 2013). Netflix does not license its content, as it is one of the selling points of their subscription; therefore in this setting TV series produced in-house are not very profitable. However, this may change, as Netflix grows, bringing down fixed costs per user.

### 2.6.3. Discussion

Netflix uses a conservative model from the era of movie rental, where users are charged a flat fee for the privilege to watch their content. Netflix's model is simple and relies on the money that *all* users of the content pay. This model has an advantage as it eliminates the chance of free riders, and reluctant advertisers, which are possible in the case of ad-supported (users skipping ads), or donation based models. However, the maintenance of the content collection requires scale in the number of users. Therefore this model would have a break-even point that needs to be reached fast enough for business to be profitable. The model may prove to be attractive to content aggregators that already have a user base, but expect a switch in the model (e.g., cable TV).

## 2.7. Online Pay-Per-View: iTunes

In 2003, Apple launched the virtual iTunes store, based on the media player with the same name, where consumers can buy and download digital music and video on demand (Neumayr and Garlinghouse, 2012). Apple's iTunes evolved from a music player to a virtual media marketplace. The most recent version of iTunes, iTunes 11, enables users to buy and download a variety of media content such as songs, movies, TV shows, iBooks, podcasts and gift cards (Neumayr and Garlinghouse, 2012).

### 2.7.1. Content Delivery

The key factor of iTunes's success is its content delivery model which allows consumers to consume their favourite content anywhere and on various devices (Neumayr and Garlinghouse, 2012). There are many devices such as iPads, iPhones, iPods and Apple TVs – over 315 million devices worldwide (Staff, 2013; Miller and Monaghan, 2012).

Moreover, iTunes enables the consumer to download legally thousands of inexpensive songs and videos through the iTunes store. It offers online sales of over 26 billion pierces of media content including videos, TV shows, songs and e-books (Miller and Monaghan, 2012). The iTunes player has free software with state-of-art features for automatic updates, and it preserves personal security and reliability. The cost of the content is reasonable, which authorizes content delivery to be legal, so consumers are satisfied that they are not breaking any copyright laws.

### 2.7.2. Revenue Model

The main sources of revenue for iTunes include music (both audio and video songs), movies, TV shows, audio books and iTunes affiliate programs. These sources earned Apple Inc. a total of US$1.4 billion in 2011 Q1 (Dilger, 2011), and the store had sold twenty-five billion songs worldwide by February 2013 (Monaghan and Garlinghouse, 2013).

The revenue model of Apple's iTunes (see Fig. 7) works on the principle of pay per content download (a la carte business model). This allows users to selectively buy

pieces of content, not bundled in any package, such as a music album. Moreover, Apple's iTunes introduced a three-tiered pricing structure in April 2009. The user can buy songs (both audio and video) at three different prices (69¢, 99¢ or $1.29) depending on the popularity of the song (Adegoke, 2009). Similarly, there are pricing tiers for movies and TV shows, depending on the quality and ratings of the content. For instance, the price of feature-length movies in SD format typically ranges from $14.99 (for new releases) to $9.99 (for most other movies), while television episodes, short movies and video songs cost $1.99 (standard definition) and $2.99 (high definition). In addition, the store offers timely bundle promotions on popular movies and TV shows (Pope and Neumayr, 2006).

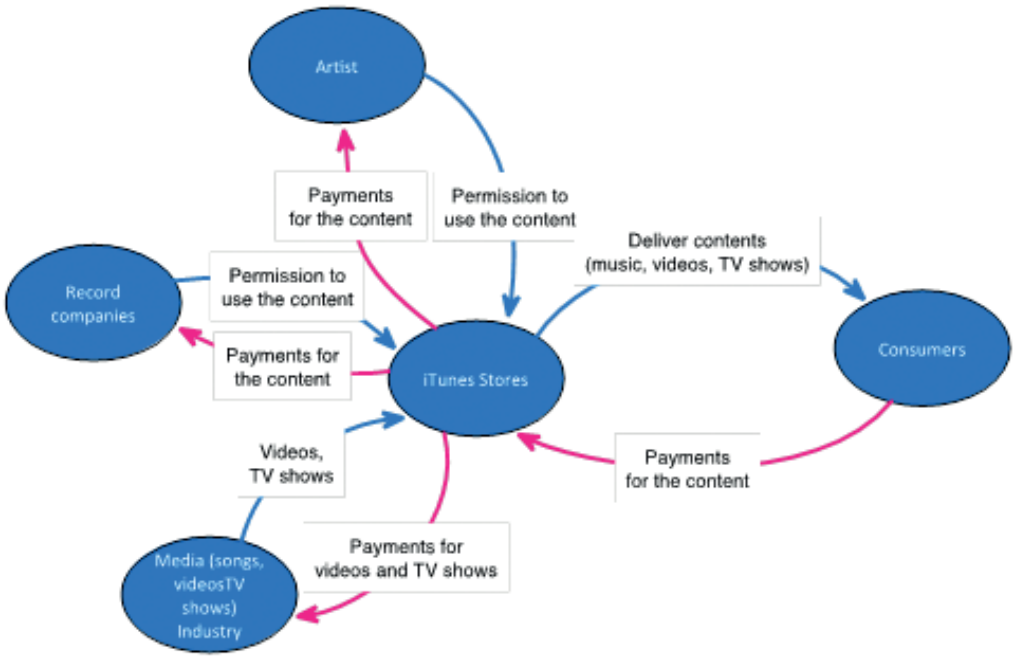


**Fig. 7.** ***The Business Model of iTunes***

### 2.7.3. Discussion

The unprecedented success of Apple's iTunes is a combined result of efficient content delivery, intelligent business strategy and distinct models for generating revenues. According to Apple's press info, Apple was the leading media content seller in the world in 2010 (Roth and Neumayr, 2010). Apple's iTunes provided the real essence of value and convenience to its consumers by offering the opportunity to consume content on multiple devices. However, this opportunity is restricted mostly to Apple's devices, and many consumers do not like that limitation.

## 2.8. Online Piracy: Pirate Bay

Online piracy refers to unauthorized copying and/or downloading of copyrighted or patent digitalized content (Hill, 2007). According to a study (Warr and Goode, 2011), the rate of online piracy in the U.S. is estimated to be 21 percent, which is considered relatively low as compared to other regions of the world where the average rate is 88 percent. The phenomenon of online piracy originated from Napster software. Napster, a P2P (peer-2-peer) file-sharing technology-based program was developed to utilize Internet as a medium for copying music files stored on a peer's hard drive (Choi and Perez, 2007).

The current online piracy model is based mostly on BitTorrent technology, introduced by Bram Cohen in 2001. BitTorrent originally extended the P2P model by facilitating downloading video files from a collection of peers, rather than a single peer, on a bit-by-bit basis eventually decentralizing the content of the video from any single storage (Choi and Perez, 2007). The evolution of online piracy and related technologies promoted the development of more sophisticated content delivery, business and revenue models. In this study, we focus our analysis on one of the public BitTorrent portals – Pirate Bay.

### 2.8.1. Content Delivery

Pirate Bay is one of the most prominent public BitTorrent portals responsible for a significant portion of the current content delivery model using BitTorrent technology. In addition to Pirate Bay, the other two key players in the content delivery model are content publishers (users) and trackers. Pirate Bay is responsible for hosting thousands of torrent files and provides a user-friendly interface to search the database. Each torrent file contains IP addresses of trackers along with other information related to the content. The user searches for the desired content on Pirate Bay and receives the .torrent file. On opening the .torrent file, the user connects with the tracker to get the IP addresses of all the peers sharing the content. Finally, the user connects with the peers and downloads the content.

### 2.8.2. Revenue Model

Pirate Bay is one of the key players bringing substantial financial profit to the online piracy ecosystem. Pirate Bay quickly removes any fake or virus-infected content and offers reliable service for torrent indexing, and thus it has a vital role in the ecosystem. As a result it attracts huge amounts of Internet traffic on the portal and eventually becomes a perfect target for profit-seeking publishers in order to advertise their websites and/or content. For example, Pirate Bay has been ranked 94$^{th}$ in the Alexa Ranking and its revenue is around $10M (Cuevas, Kryczka, Cuevas, Kaune, Guerrero and Rejaie, 2010; Jelveh and Ross, 2009)apart from required resources, publishing (sharing.

Most of the revenue for Pirate Bay comes from the ad-supported business model. The model allows various Internet ad companies to place ads on the portal, and in

turn Pirate Bay receives payments for ad placements. The flow of revenue of Pirate Bay is illustrated in Fig. 8 (Sudler, 2013). Moreover, a small portion of the revenue in the online piracy ecosystem also comes from the private BitTorrent trackers. These private trackers offer premium service to consumers and seek donations from them. The premium service includes faster download bandwidth, less latency, and high-quality pirated content. Moreover, these private trackers also earn money from a few Internet ad companies seeking prospective valued customers (Sudler, 2013).

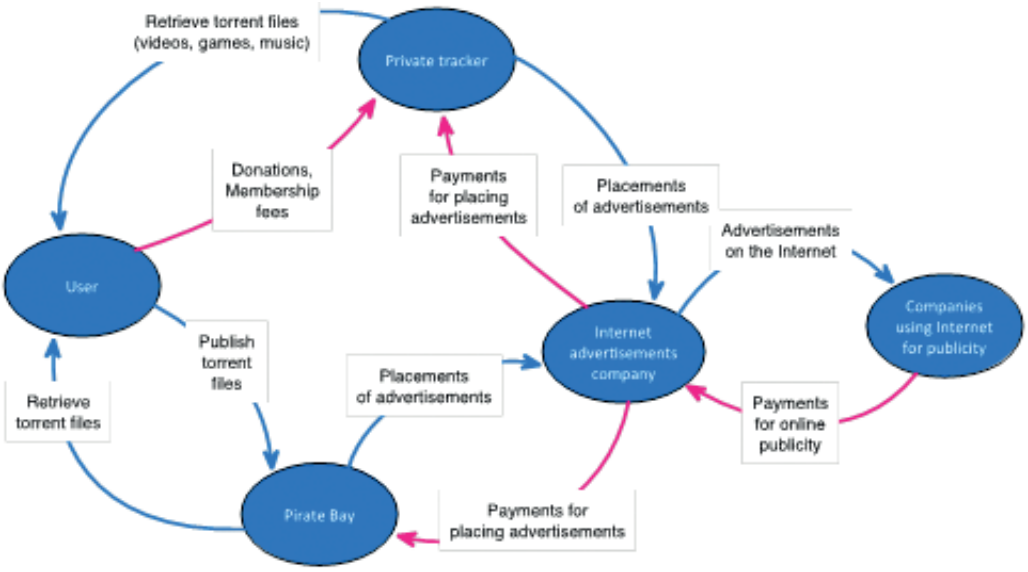


**Fig. 8.** ***The Business Model of Pirate Bay***

### 2.8.3. Discussion

Piracy in any form is illegal and unethical; however, it demonstrates the feasibility and potential market acceptance for consuming media (videos, TV shows) over the Internet. In essence, piracy is related to the value and convenience to consumers. This fact has been exploited by Pirate Bay, whereby offering reliable content aggregation service and the ability to consume favourite content free-of-charge. However, at the same time, consumers are deeply concerned and unsatisfied with the risk of consuming illegal content, which brings the future of online piracy under debate. Online streaming video service Hulu demonstrated that by providing a choice for people who are willing to acquire content legitimately. "The original idea behind Hulu was to give viewers a legal, TV-on-demand free streams alternative to downloading pirated content, which appears to have worked" (Riley, 2009). In the Swedish music industry the streaming service Spotify already has converted the majority of illegal downloaders to their customers with the easy-to-use and accessible service (Ahrens and Kreidenweiss, 2012).

# 3. Value

In previous sections we have shown the tangible flows between various market players. They consist of products and/or services what one role gives and the respective money that role receives. In this section, we show the intangible flows, which represent other values in addition to monetary value. An overall diagram of the intangible flows is presented in Fig. 9.

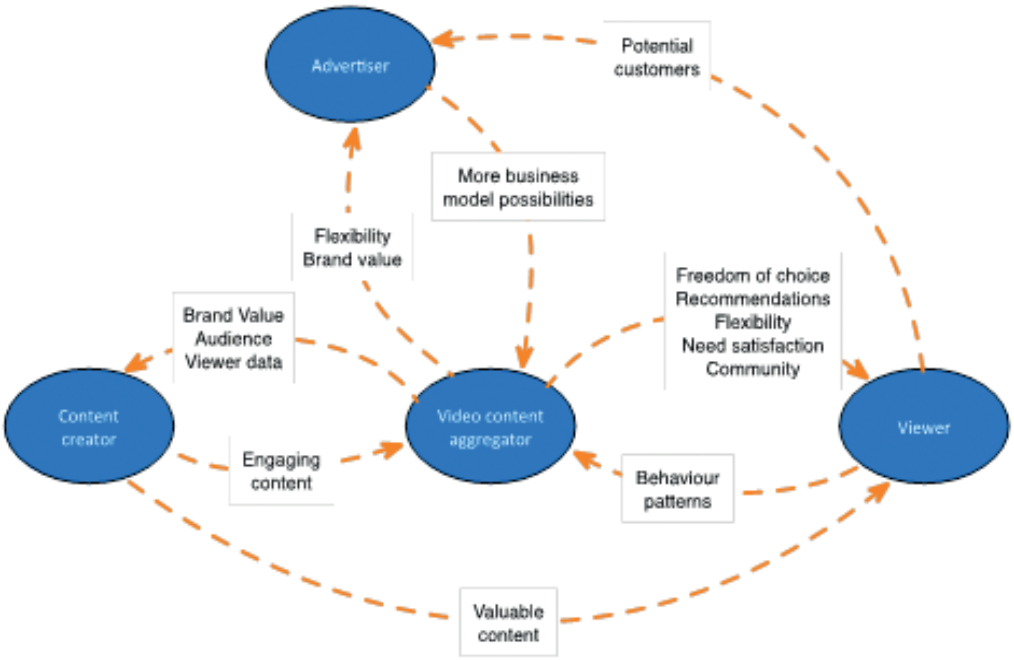


**Fig. 9.** ***Intangible Values***

Intangible values include concepts concerned with the behaviour of the users, their emotions and abstract values such as trust in a brand. For advertisers and content creators it means greater creativity, new ways of engaging viewers and anticipation of their demands. In this section we highlight some of the values that video content aggregators can bring to the involved parties.

## 3.1. Value to Viewers

The value to the end user, the viewer, has been studied in different contexts. In this section, we will look at the value to the user from two perspectives: the uses and gratifications theory and technology acceptance models. The first perspective attempts to explain why people consume media, while the second has been developed to evaluate whether people will start to use a novel technology or not.

### 3.1.1. Uses and Gratifications

The uses and gratifications (UG) approach focuses on the reasons behind people's choices to consume mass media (Katz, Blumler and Gurevitch 1973). Understanding the audience's motivations can help video content aggregators create a service that satisfies the needs of the audience and thus generates gratifications that attract the audience to return to the source of the perceived gratification. The UG approach makes some assumptions about media consumption. The main, and most criticized, assumption is that media consumption is goal-oriented, and that the audience actively chooses the medium that they consume. In the past, it might have been a valid counterargument that people do not choose the medium but instead use the medium available to them in their circumstances. However, today, with the plethora of choices of media sources, one could say that the active choosing assumption is truer than ever, although, as many scholars have argued, the level of activity can vary (Ruggiero, 2000). According to the UG approach, the audience makes their choices from the available selection based on their needs, motivations and expectations of the gratifications that they will receive. For example, researchers have found that reading a book satisfies the need to spend one's time in a worthwhile way, while viewing television can satisfy the need to feel connected to society.

In the context of the TV medium, researchers have utilized the UG approach to discover the motivations for TV viewing. The traditionally used motivations are companionship, passing time, habit, escape, relaxation, entertainment, arousal and information (Rubin, 1983). These motivations can be divided into two clusters: social compensation and mood management (Finn and Gorr, 1988). Social compensation motives, i.e., the motives that compensate for the inadequacies in the individual's social life, are companionship, passing time, habit, and escape. Relaxation, entertainment, arousal and information belong to the mood management cluster. Mood management refers to the individual's need to regulate physiological arousal; s/he gets satisfaction from reaching an ideal level of arousal.

When designing a video aggregation service, it also is important to understand that different people have different motives for viewing TV. The results of a study on individual differences show that shy or lonely people seek social compensation from viewing television, and people who are more successful in their social life are more likely to seek mood management (Finn and Gorr, 1988). Another study found that the needs to pass time, companionship, relaxation, and stimulation motivate people who score high on the neuroticism personality trait, while socially outgoing extroverts were strongly opposed to the notion of using television for companionship (Weaver, 2003).

In online user shared video viewing, a study found that motivations are at quite different levels compared with television (Bondad-Brown, Rice and Pearch, 2012). Despite the social features of YouTube, social needs did not motivate YouTube viewers as much as information seeking. For generations born before 1977, there was evidence of a slight compensating use of YouTube, i.e., they watched less television due to YouTube. However, for Generation X, defined in the study as being born after

1976, the authors found a complementary behaviour; they watched YouTube clips of their favourite television shows. Another study also found the information-seeking motivation for viewing online videos but also social motivations in the form of social interaction and co-viewing (Haridakis and Hanson, 2009). In a comparison of online video and television viewing, entertainment and habit were the main motivations to view television (Cha, 2013). Habitual patterns developed over the past decades of television viewing dominate not only the choice of platform, but also the genres that people watch. Relaxation and information seeking were the main motivations for choosing the Internet platform. The study also revealed that the need to relieve boredom is fulfilled today more by online video than by television.

### 3.1.2. Technology Acceptance

Unified Theory of Acceptance and Use of Technology (UTAUT) was created for predicting whether consumers would adopt new technologies in the workplace (Venkatesh et al., 2003). Later it has been modified to fit the consumer context to predict voluntary switches, i.e., would users switch from following traditional television broadcasting to using online video content aggregators in some capacity? The model is comprised of factors that predict behavioural intention towards using a novel technology. The factors in consumer context are price value, effort expectancy, social influence, habit, performance expectancy and hedonic motivation. These have differing amounts of explanatory power over behavioural intention, and participant variables such as age, sex and experience with particular technology can modify the impact of a particular factor. These aspects moderate behavioural intention to use a technology, which, with facilitating conditions (support, guidance etc.), then predict actual usage (Venkatesh, Thong and Xu, 2012). Of these, habit and hedonic motivation are related to motivations discussed in the previous subsection. Performance expectancy of entertainment can be considered to be the degree to which a technology can answer to the motivations that the user has and thus is related to U&G.

As discussed earlier in the chapter, different types of video content aggregators have different ways of monetizing their services. Generally, users either pay with their money to get an ad-free experience or they pay with their time by having to watch commercials, which both affect the perceived price value of the service. This even has led to technology-led practices of minimizing the price, such as time shifting programs on DVRs for the explicit purpose of being able to skip ads (Notkin, 2006). Working with multiple electronic devices, on the other hand, affects effort expectancy: how easy is the system to use. In the context of online video content, effort expectancy relates both to the playback features as well as to finding interesting content amongst all possibilities.

Content is an important factor in user satisfaction with different media (Palmer, 2002). It also has been established as crucial in relation to novel television technology acceptance (Jung, Perez-Mira and Wiley-Patton, 2009). Different video aggregators can provide different types of content (e.g., only full-length movies or user uploaded

videos which are shorter than fifteen minutes). In addition, even if the content type is the same, e.g., drama series, the individual pieces of content might be different or they might be available at different times. The timing and pieces of content can influence the choice of platform via social influence. Social influence also can predict intention to move away from traditional television (Shin, 2009).

#### 3.1.3. Discussion

Users cannot be seen as a mass, but as individuals, who have different priorities and motivations, which direct their choices. For example, the choice of preferred payment method (time vs. money) most likely depends on the user type – people with tight finances, e.g., young people and the unemployed, might consider that they would rather spend their time on advertisements. Piracy, besides being difficult, has the added price of being illegal, which proposes a certain amount of risk.

The UG studies have shown that currently the main motivations to watch traditional television are habit and the need to be entertained. However, the current trends suggest that long shelf life content is moving to new aggregation platforms. Habit seems to be the main inhibitor of this change. In order to attract habitual viewers of traditional television, the new aggregators should provide an easy way to transition to the new services. One particular aspect of habit is choosing the content.

### 3.2. Value to Advertisers

Throughout the decades, video content aggregators and advertisers have become two inseparable parts of a whole. Understandably so, as mentioned in the section 2, two-sided market models involving advertisers is one of the dominant business models in the media landscape.

Of all media aggregators, television was, and still is, the most popular advertising channel. This can be easily seen in that company ad spending, on average approximately 60 percent of advertising budget, is spent on TV ads (Nielsen, 2013; Berman, Battino, Shipnuck and Neus, 2009). Moreover, despite the impressive growth in Internet advertising, TV firmly holds its ground (Nielsen, 2013). The success of the medium is based on a number of factors. Television has invaded our living rooms, and even today with an abundance of different media and sharp growth of the Internet, an average American still watches around five hours of TV per day ( Nielsen, 2013).

In addition to the sheer numbers TV manages to reach, there is another factor: TV advertising is easy. If the advertiser acquires prime-time spots, the number of potential customers reached is so large that the probability of some positive effect of the campaign is high. However, doubts on the effectiveness of TV advertising have been cast, and more people are talking about the advantages of advertising in the new media, such as the Internet and mobile (Berman, Battino, Shipnuck and Neus, 2009).

### 3.2.1. Measurement and Advertisement Goals

One big change new video content aggregators bring is the ability to measure the demographics of the audience, its activities and its reactions to advertisements. In the era of traditional TV domination in video content aggregation, advertisers had few indirect measures to determine if ads worked. Namely, TV stations provided station and program ratings in terms of audience, which were based on surveys, and companies whose products were advertised provided reports of sales of the product for that period as well as customer surveys. While all of this provided a good approximation of advertisement impact, the method still resembled carpet-bombing, rather than a precision strike.

Enter the new media! Thanks to the unique identifiers of Internet users and the amount of information they share willingly, it is possible to measure exact things about each user. Besides demographic data, Internet-based video aggregators such as YouTube and Netflix can pinpoint not only the information such as the videos and ads viewers click, but also the extent to which particular videos are watched and the rates at which ads are skipped. Content marketplaces such as iTunes can follow users' purchases and "window-shopping" behaviour to create customized suggestions for a particular user. Some common measurements in the new media include attention, interaction, conversation intensity and tone, velocity and impact of the advertisement (Fisher, 2009).

The value of such information is self-evident. Manager-oriented academic literature points out the growing importance of alternative advertising approaches based on the impact (Berman, Abraham, Battino, Shipnuck and Neus, 2007; Kono, 2009). It can be argued that such an approach brings enormous value to the advertisers, as ideally every cent spent on the advertisement distribution can have maximum impact, coupled with user satisfaction as ads become highly targeted.

The downside of the user data is obsession with and inability to measure it properly. Measurement of ROI (return of investment) in the new media has been a hot topic for the past five years. Measurement methods are introduced at a great speed only to be discarded quickly for another supposedly better one (Fisher, 2009). This complicates the task of the advertisers, as they have to set clear strategic goals for advertising campaigns and make sure the right methods are deployed in order to measure achievements.

### 3.2.2. Open Exchange and Ad Marketplace

The other departure from traditional ad-supported video content aggregation are the openness of the ad market (Berman et al., 2009) and the availability of various channels with specific costs, audiences, rules and potential impact. This brings two major changes to advertisers: ability to create new types of advertisements and change in cost structure (Berman et al., 2009; Teixeira, Wedel and Pieters, 2013).

Traditional broadcasters have rules and restrictions when it comes to advertising. Limited length of ad spots, fixed ad spots per hour and fixed standards on quality

and type of ad, to name a few. However, new channels such as online video provide new freedom to advertisers. There are numerous examples of video ad campaigns that are made solely for online sources. Among those are ad clips of shoes that are nine minutes long and Do It Yourself ads on a shoestring budget, such as "Will It Blend" campaign by Blendtec (Teixeira et al., 2013). The provided value for the advertiser here is the ability to choose the audience for the ad, achieve fast spreading of the message with immediate impact, and most importantly higher involvement of viewers.

Another change emerging from the new media is the method of ad spot pricing. Traditional TV stations charged fixed prices for ad spots depending of the time of the day and the rating of the TV show, disregarding any other impact of the ad. The new media offers new models. YouTube has successfully implemented skippable pre-roll video ads. Such ads can be skipped after just five seconds by the viewer, and the advertiser pays for the ad only in the cases where the viewer watches the full ad (Mehrotra, 2012). This is the win–win situation, as YouTube does not annoy its viewer with ads, and advertisers pay only for the ads that truly caught the attention of a potential customer.

Frequently, initial pricing policy is different as well. Instead of setting the prices based on aggregators ratings, many new video aggregators set auction systems for the ad spots, where the market decides what a particular ad is worth (Berman et al., 2009). This is possible also because video aggregators can now offer detailed targeting to the advertisers, thus finding the best-suited advertisers who are ready to pay for each spot.

#### 3.2.3. Discussion

New aggregation platforms, enabled by modern communication technologies, hold the promise of enhanced value for advertisers in the form of better targeting and higher customer satisfaction. The trends that drive this value discussed here are: *measurements, changes in advertising strategy* and *aggregator pricing of the ad spots.*

### 3.3. Value to Content Creators

Different values motivate content creators, such as dispersing information, entertaining, expressing oneself, and becoming rich and famous. In this section, we examine three values that future content aggregators can provide to content creators. First, we look at financial value, which is the main value for most content creators. Second, we consider the audience as a value. Third, data, like viewer ratings, is considered. Finally we examine new opportunities that Internet-based aggregation creates.

#### 3.3.1. Direct Financial Value

Amanda Lotz has written an excellent introduction into the changes in U.S.-based TV production in her book *The Television Will Be Revolutionized* (Lotz, 2007). After regulation was relaxed in 1995, media conglomerates bought networks and studios,

and they are again able to dictate terms to production companies. Currently the largest television productions are deficit-funded, which means that the production company sells an initial license to a network at a lower-than-production-cost, and if the production is successful the production company can license the show to different networks, i.e., syndicate. Syndication enables the release of the content to different distributors at different times.

The different release windows can generate great profits as shown by shows such as "Friends" and "Seinfeld", which originally aired on NBC, each earning over $3 billion through syndication. Netflix also licenses their original programming from production companies. In the case of the hit show "House of Cards", the production company Media Rights Capital sold exclusive rights to Netflix for a limited time window, after which Sony Pictures Television will distribute the show (Media Rights Capital, 2012). However, for content produced for traditional broadcasting, the online aggregators provide an additional distribution window between the debut airing and reruns. Netflix, Hulu and Amazon spend around $3 billion per year to license content, and the spending is increasing (The Economist, 2013). Thus, the value of archives is growing as copyright owners can profit from older programs that online aggregators such as Netflix are acquiring.

On the one hand, as the viewers want to be able watch any show whenever they want, the licensing of content across the globe becomes more important. On the other hand, people want local content, and this is the lifeline for many local companies that function for example only in their national market and in their local language. In addition to original shows, the content creators utilize television program formats. Formats are safe bets for local content creators, viewers and aggregators. A format's success in other countries often predicts a success in new countries. Furthermore, the shows based on formats are safe viewing for audiences, as they instantly know what content they are getting.

### 3.3.2. The Audience

As the audience grows, the chances increase for show syndication, which in turn increases the number of viewers. Besides the direct financial value gained as the increase of show value to the aggregators, the audience size increases the value of the show's brand. Another indirect financial gain from increased audience size comes from product placement, which has increased in recent years. Global product placement expenditure has risen annually over 10 percent (Warc, 2012), which surpasses the growth rate of all advertisement spending. Product placement in traditional television has been heavily regulated, but recently regulation has relaxed even in Europe (Lefever, 2013). On the Internet, regulation has less effect as the service providers can reside in a country different from the country of use, and enforcing the regulation is difficult due to the large number of service providers. The audience demographics also have an influence on the attractiveness of the service as a platform for product placement.

### 3.3.3. The Data

New technologies enable the collection of accurate and detailed data from and about the viewers. While in traditional broadcasting, viewer ratings give general viewer demographics based on samples; the new aggregation platforms enable the collection of detailed personal information and detailed behavioural information within the service of all the individual users. The content creator could use the information to predict a show's success and to drive production into a more preferred direction. For example, Netflix used the extensive collection of its customers' viewing behaviour data to help produce the hit show "House of Cards" (Carr, 2013a). However, the decision to share the data with the content creator lies with the content aggregator. Using Netflix as an example again, there is no way of knowing even how many viewers their shows have, and this makes the playing field uneven because traditional broadcaster's viewer ratings are public in the U.S. (Pomerantz, 2013). Demographic and contact details would also facilitate managing customer relationships between and during the viewing of episodes.

### 3.3.4. New Opportunities

Easy access to the content via Internet on a multitude of devices also has changed the way that viewers consume content. As viewer behaviour changes, content needs to adapt. Especially those viewers who spend much time with social media and are technologically apt are changing not just the content delivery method but also the content itself. More and more often viewers binge-view an entire series or at least watch several episodes back to back. The old staple of a series, the end cliffhanger, is obsolete for people with these new viewing habits. New story formats are being created, and scripts are adapting by becoming more complex with longer story arcs and deeper characters (Steel, 2013). As viewing behaviour is more precisely monitored through Internet viewing, scripts are adapted in order to keep the masses watching. Many scripting professionals see this as a homogenization of stories and less creative scripts as the quantity of the audience leads content, not originality.

### 3.3.5. Discussion

The new Internet-based aggregators provide a new release window for content, which can be financially profitable. New technology also allows for small-scale content windowing, e.g., a tier system can be used in content release where the most valuable top tier customers receive the content a few days before the following tiers. As a benefit to the customer, the lower price would allow more viewers to enjoy the content, albeit with a delay.

As the importance of product placement increases, audience size and viewer ratings also become more important for the content creator. The more detailed data can be valuable also to the content creation process, particularly if the motivation is to generate hit shows. Providing detailed viewer behaviour data to the content creator can be a competitive advantage to the aggregator.

# 4. Predictions

Above, we discussed online video aggregation from business models, viewer, content creator and advertiser points of view. It is important to note that not all value can be described in terms of flows of money and flows of content; there are different kinds of values that aggregators can offer to these groups.

## 4.1. Viewer

The power of the viewer will become even stronger than it is now. The role of gatekeeper, which is usually associated with the aggregator, will shift to the viewer. With linear television, it is easy to choose what to watch, as the choices are limited to what programs the TV stations broadcast at a given time. The mental workload for choosing what to watch is much higher on a service that provides access to thousands of titles at a time, such as Netflix. There is an obvious conflict as the vast selection attracts people, but at the same time the arduous process of selecting repels them. This conflict was also recognized in Deloitte's 2012 report (Deloitte, 2012) which quotes psychologist Barry Schwartz: "Choice is cherished but choosing is a chore."

The content will start to reflect the fragmentation of consumers: with linear television shrinking to mostly news and live events, there will be specialized, personalized online schedules. We predict that the existence of a personalized TV schedule will ease the transition from a linear service to a nonlinear service and further the development of habitual watching. When personalized, the TV schedules will cater to a variety of individuals who have different motivations for viewing television. Serendipity and being exposed to content, which you do not actively choose, will be marginalized. Only big players such as YouTube might still be able to introduce wildly different points of view to the consumer.

Even though the role of linear television broadcasting as the glue of the society will diminish, people still want to bond over content. This will happen via social media connectivity of content aggregators and services which enable viewers to discuss content as it unfolds as in the golden age of linear broadcasting. Janne Paalijärvi, spokesperson of the Pirate Party in Finland emphasizes social aspects: "Adaptive and intelligent user interfaces will be more popular. These UI's have social networking functionality like recommendations, group watching, and chat."

## 4.2. Advertiser

The role of advertisements will become less noticeable to the end user and at the same time more pronounced to the content creation side. Commercial breaks, such as in linear television nowadays, which are already skipped whenever possible, will become obsolete. Instead, surreptitious advertising will become the norm – anything from product placement to whole pieces of content that are carefully crafted to en-

force a brand message. Producer Riina Hyytiä explains how the influence of product placement and sponsors is growing: "Sponsors are becoming more important as producers look for multiple sources of funding, because production costs are rising with audience expectations."

Paavo Tervonen, head of online video at Sanoma and Nelonen News, wants viewers to tune into their services – whatever their needs, from entertainment to news – and says that video advertising is highly productive and there is great potential for growth. Advertisements will be better targeted. It will not be uncommon for the content creation process to happen fully in an advertising agency where choices are made based on user data rather than artistic vision. Separating advertisement-driven messages from other content will require better media literacy skills from the viewers. The aggregator also can provide data to the advertisers and content creators about their content; this could be a competitive advantage for the aggregator.

### 4.3. Content Creators

Privacy will become a luxury. The big data state of mind will flourish, and therefore everything about a person's viewing behaviour will be turned into numbers to guide content creation. Viewers who value their privacy will choose piracy instead of letting people know their viewing habits – not out of financial necessity but out of concern. In the words of Janne Paalijärvi, the spokesperson for Pirate Party of Finland, "If harassment of piracy services continues, some form of encrypted p2p is likely to become dominant design. After this chasing single p2p users will become next to impossible." This is also true for people interested in certain topics, such as some subdivisions of pornography. Being able to not share all of your data with the content aggregators requires either enough technical knowledge or money to buy a service to hide your viewing patterns. Most of the population will not be worried about sharing their data, and this data will be well utilized by aggregators, advertisers and content creators.

Future consumers will consume more and more video content in shorter bits. A typical episode in a typical series will be less than ten minutes, and these often will be binge-viewed (Thorpe, 2013). With the advance of mobile, non-disruptive technologies, such as the recently introduced Google Glasses, will make it very easy to tune in to watch video content while, e.g., commuting or waiting for someone – gaps that are currently filled by reading items on a smartphone. The omnipresent high-speed Internet will no longer present boundaries to image quality, long buffering times will be a thing of the past, and switching between devices will be easy.

Society as a whole will be divided further by their media consumption. Those who have enough education, technological know-how and funds can, and will, pay for quality content, distinguish between advertisements and actual content and, if they wish, hide their digital fingerprints. On the other hand, those who cannot afford or do not see the need to pay for content will consume advertisements and blatant

product placement as actual content. The worldviews and values of these two groups will be vastly different, as will the business models that cater for them.

## 4.4. Business Models

We recognized some important key features of the business models presented above. The most important advantages and disadvantages are presented in Appendix 1, Table 1. We predict that the underlying business models will not change dramatically. Advertisers will still fund the commercial channels, but the advertisement is embedded in the content. This means that the aggregators do not need to license the content, but the advertisers pay both: the content creators for the content and the aggregators to spread their message.

Users want convenience from their video content provider so that they do not need to make choices regarding what to watch. One way to achieve this is by focusing on a particular niche. Topi Lintukangas, CEO of SEK & Grey predicts that aggregators will gather around a theme. This will enable advertisers as well as content creators to reach viewers who are specifically interested in a certain topic, e.g., cooking or surfing. Information security and trustworthiness in itself can be enough of a team for some viewers, but most aggregators will have to aim at branding themselves as trustworthy. Petteri Pulkkinen, Content Delivery Specialist at Mediatrade, says that, as content will be available on various platforms anytime, aggregator branding will determine which aggregator people will turn to. He explains that viewers will turn to the aggregator that manages to reach their hearts (branding), wallets (trustworthy billing) and living rooms. The most trustworthy aggregator brand will win. A new Swedish aggregator Magine also emphasizes trustworthiness towards content creators. The firm wants to gain the support of content producers by making fair distribution and copyright contracts.

Our prediction is that leading aggregators in the future will not compete with multiple theme-centric platforms. Instead, the ease of use is created by utilizing user-based data. Users and viewers will adapt to more sophisticated recommendations or customization algorithms enabled by user data. Advertisers also will want their share of the data and will give their business to those aggregators who provide user data as a part of the deal.

According to Finnish industry representatives, another important aspect, especially in Europe, is catering to local audiences, as opposed to trying to attract viewers globally. CEO of Finnish Elisa Viihde, Kirsi Valtari, says their advantage is local content in the local language: "There will always also be local markets. Viewers want local content; this is the differentiator for local aggregators." Producer Riina Hyytiä agrees that local aggregators are of utmost importance for local production: "The only significant advantage for local producers is language. Producers must search wider for funding, so local aggregators become involved in content production."

Those aggregators who provide content created by advertising agencies for international audiences will have a far wider audience and more stable revenue stream than those focusing only on quality content or exclusively on local content. Additionally, the ability and willingness to adapt to big and small changes in user behaviour in a flexible way will make sure that an aggregator will both attract new users and retain old customers.

# 5. Conclusion

With the advancements in technology and the Internet, media is undergoing a rapid transition from traditional cable TV to online broadcasting, and in this regard the role of content aggregators has become more significant. In this report, we presented the demands of viewers, content creators and advertisers for the future business model of online video content aggregation.

We found that viewers wish to attain different goals by consuming video content. In the future, viewer fragmentation is expected in terms of what content is consumed, when, where, with which devices and how it is paid for. In other words, different people want different things, and aggregators should be prepared to cater to vastly different needs and desires. Furthermore, we found that habit is one of the main reasons why people watch television, and aggregators must design their service accordingly. Our findings suggest that a personal TV schedule based on the behavioural data of the individual will attract the viewers of traditional linear television and facilitate the development of habitual television watching.

Our investigation revealed that the content creation process is becoming more data-driven, and providing the content creators with accurate behavioural viewers' data can be a competitive advantage to aggregators. Furthermore, the trend of increased product placement in video content can lead to financing productions solely with product placement. The aggregator can then provide the product placement financed content for free to the viewers, while charging them for premium content. Content creators will want aggregators to provide them with extra value, like channels committed to extra footage and archives of certain popular programs.

In the future, advertising will become more complex for advertisers, yet they will have more choices. There are multiple platforms and modes of advertisement delivery; prices for ads reflect their impact more accurately than before (auction-based pricing, pay-per-view/click, etc.). Advertising also will be more measurable and data-driven. The advertisers can test multiple variations and make ads that hit the right target with maximum effect. On the downside, however, customers are becoming more demanding towards the ads and will choose to skip them if they can, unless the ad delivers real value to them (either informational and/or entertainment).

All home devices will become Internet enabled, and the traditional distribution channels, terrestrial, satellite and cable, will not be upgraded to support new tech-

nologies like 4K. Because of the flexibility of the Internet, we will see many more innovative business models for online video content aggregation in the future. The most striking factor for these business models will be the value and convenience to viewers. The value and convenience include the needs and motivations of the viewers, their preferences, personalization, watching habits and culture.

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# *Appendix 1*

**Table 1*: Summary of Existing Business Models***

| | Pros | Cons |
|---|---|---|
| Traditional TV: NBC | • Traditional terrestrial TV<br>• Combined role of content creator, content aggregators and content delivery<br>• Large number of viewers (good to attract advertisers)<br>• Many different sources for generating revenues (a giant media corporation) | • Very similar broadcaster worldwide (strong competition)<br>• Linear broadcasting<br>• No value and convenience |
| Subscription: HBO | • Cable TV and satellite TV distributors and content creators as well<br>• Larger number of viewers<br>• Subscription-based revenue model<br>• No need for advertisements<br>• Value and convenience (Pay TV model) | • Is not a content aggregators and main role is content creators<br>• Value and convenience with cost |
| Open Online: YouTube | • Internet-enabled content distributor/ aggregator<br>• Large number of viewers because of Internet<br>• Free content<br>• Ad-supported revenue model<br>• Value and convenience to viewers to some extent<br>• Nonlinear broadcasting<br>• Technology-oriented and scalable (because of Google corporation) | • Google dependence: an unreliable revenue model, in case scale up (e.g., incomes from adds may not necessarily catch up with demands caused by increase in users and content)<br>• Not so much value and convenience to viewers (i.e., not every content is available) |
| Online Subscription: Netflix | • Internet-enabled content distributor/ aggregator plus content creator<br>• Subscription-based revenue model (monthly flat fee)<br>• Highly nonlinear broadcasting<br>• Value and convenience to viewer (watch what they want)<br>• No advertisements | • Conservative model (charging flat fee for all the users)<br>• Scalability of the collection of content. More and more content should be offered in order to remain in business. |
| Pay-per-View: iTunes | • Internet-enabled content distributor/ aggregator<br>• Highly economical pay per view revenue model (a la carte model)<br>• Highly nonlinear broadcasting<br>• Strong value and convenience to viewers (ability to consume their favourite content anywhere on multiple devices)<br>• No advertisements | • Closed system meaning content available for Apple's devices |
| Online Piracy: Pirate Bay | • Internet-enabled content aggregator/ distributor<br>• Content freely available<br>• Advertisement-based revenue model<br>• Nonlinear broadcasting<br>• Value and convenience to viewer<br>• Flexible and adaptable for technology change. | • Risky, illegal and unethical<br>• Consumer's deep concerns and unsatisfaction about the illegal content |

**Table 2*: Interviewee Profiles***

| Name | Position | Company/organization |
|---|---|---|
| Riina Hyytiä | Producer, CEO | Dionysos Films Oy |
| Topi Lintukangas | CEO | SEK & GREY Oy |
| Janne Paalijärvi | Spokesperson | Pirate Party of Finland |
| Petteri Pulkkinen | Content Delivery Specialist | Mediatrade Oy |
| Paavo Tervonen | Visual Director and Head of Online Video, TV News | Sanoma |
| Ulla Koivula | Executive Vice President | Magine AB |
| Kirsi Valtari | CEO | Elisa Viihde |

# How Will Digital Media Impact Education?

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**Abstract.** This research study predicts the role of digital media in the future of education. The goal of the study is to address the fundamental research question: How will digital media impact education? To answer this question, the study identifies *signals* to the future of education and presents a case scenario predicting a typical day of the fictional child *Junior* at school in 2025. The scope of the research focuses on primary level education in Finland.

**Keywords:** education, future, Finnish education system, games, micro learning, online education, signals

# 1. Introduction

The word "education" defines the act or process of imparting or acquiring general knowledge, developing the powers of reasoning and judgment, and generally of preparing oneself or others intellectually for mature life (Dictionary.com, 2010). More intuitively, education represents activities and means of a group of people or a community to pass interests, goals, and habits from one generation to the next (Dewey, 2012). The process of learning is the acquisition or skills thorough study, experience or being taught (Oxford Dictionary). Teaching is the activity of conveying knowledge. In these terms, education can be defined also as the process of receiving (learning) and giving (teaching) systematic instruction at a school or university. The process of imparting and acquiring knowledge heavily depends on one's cognitive abilities. Since the beginning, education has been influenced by a variety of factors such as social, economical, political and media technology. However, the most influential factor is media technology (Loretta, Green, and Hansen, 2012).

Certainly, media technology has advanced tremendously in the last fifty years, and it has magnificently influenced the education system. The two big advancements in media technology include the World Wide Web (the Internet) and the mobile (wireless technology). On one hand, these advancements not only have revolutionized the way of receiving and giving information, but also have provided the door to the huge amount of information previously unexposed. Now, the information and knowledge comes in many forms including e-books, videos, games, websites and social media. Libraries have changed from buildings filled with books to online repositories of information (Friedman, L.W. and Friedman, H.H, 2013).

On the other hand, his technology has completely integrated into every aspect of students' lives. These students (often called the Internet Generation, Generation Y, millennial or digital natives) claim high levels of ownership and use of various technologies. A research study conducted in 2008 reports that college students were the heavy users of the Internet as compared to the general population (Steve, 2008). Fully 86 percent of students have already gone online, as compared to 59 percent of the general population. According to another more recent survey, the first generation to appear in the new millennium are those born after 1980 (Paul and Scott, 2010). The survey reports that in comparison to other generations, the digital natives believe that their unique identity is due to their affiliation with technology such as social networking sites, wireless technology, video games and self-created videos. A further study reports that 74 percent of teens aged twelve to seventeen have mobile access to the Internet (e.g., phone, tablet and similar devices), while 24 percent have posted videos of themselves on social media (Scott and Paul, 2012).

The heavy use of these technologies by students is transforming the established concept of learning, teacher's role and the nature of knowledge itself. Students learn more outside the school, resulting in a loss of interest and focus while at school. Moreover, as technology becomes more integrated into students' lives and educational

experiences, they need to respect themselves, others and intellectual property, while, at the same time, they need to learn to think critically about protecting themselves and others from harmful content and behaviours online (Andrews, 2013).

Thus, the learning and educational systems are facing immense pressure to adapt. The classical way of teaching is no longer viable in the presence of various media technologies. New ways of teaching that promote facilitated learning are emerging. In this regard, there are few examples where media technology has positively influenced such as one-to-one laptop education (Loretta et al., 2012), blended learning (Gecer, A. & DAG, F., 2012; Napier, N.P., Dekhane, S. & Smith, S., 2011;Thompson, 2011) and game-based learning (Tobias, S., Fletcher, J.D. & Wind, A.P., 2014. However, as the media technology continues to evolve and transform our society, exploring the revolutionary possibilities to change the education system is inevitable. To fully exploit the potential of media technology in education, we need to think beyond these few examples.

This research study extends in a similar direction and aims to predict the role of digital media in the future of education. The goal of the study is to address the fundamental research question: How will digital media impact education? To answer this question, the study identifies *signals* to the future of education and presents a case scenario predicting a typical day of the fictional child Junior at school in 2025. The scope of the research question could be very broad; however, this study focuses only at the primary level of education in Finland.

In order to identify the signals, we present the knowledgebase (source) by collecting the existing information about the topic. For this reason, we discuss the key cognitive abilities which are utilized during learning through the use of media technology. Furthermore, we revisit various types of digital media that influence education, such as the Internet, online learning, games and social media. We also describe two potential challenges that arise due to the use of digital media in education: the role of teacher and privacy. Additionally, we collected opinions from experts on this topic by conducting interviews. Next, we describe the actual methodology for identifying the signals. Finally, we present the list of identified signals and conclude the article discussing the role of media technology and importance of facilitated learning. We also propose a case scenario depicting a typical school day of Junior in 2025.

## 2. *Individual Abilities in Processing Information*

A shift is happening in schools towards online education and the change is still accelerating. This pressures schools to provide students with proper digital equipment, but it also provides media designers a challenge regarding how to design educational material in the best possible way. There are three relevant issues to learning: technological, cognitive and communication abilities. Technological abilities refer to issues

related to different devices and platforms, cognitive abilities refer to individual preferences in processing information and communication abilities which will become more important as education is shifting away from traditional teaching methods towards more group work with the teacher acting as a coach.

## 2.1. Technological Abilities

Technological abilities are the starting point, as one must possess technological skills to be able to use a variety of different technologies and platforms. Research on building technological abilities for children at home has focused previously primarily on computers as a technological tool (Holloway and Valentine, 2001). Nowadays children have a variety of handheld devices (such as smart phones, handheld games), computers, tablets, television, interactive books, games consoles, DVD players, as well as cameras and MP3 players at home. There are many opportunities for children to get engaged with a number of technological tools according to individual interest and opportunity. Some parents actively teach their children to use different technological tools, but in many cases learning occurs as children follow the way their parents or siblings use different tools. Plowman et al. (2008) discovered that preschool children typically have acquired basic levels of competence in acquiring operational skills, extending knowledge of the world, developing dispositions to learn and understanding its cultural role by the time they start school. Children possess sufficient technological abilities when going to school, but the challenge for teachers is to keep up to date with technological progress and to utilize that technology to promote learning.

## 2.2. Cognitive/learning Abilities

When technological abilities can be taken for granted the focus shifts to cognitive/learning abilities as the design of various platforms plays a crucial role for individuals' understanding of the presented material. The shift in teaching from printed material to online education brings about new challenges, as students can browse online material in a different manner than if they were reading a book, and this poses challenges also to the design of the content. It has been argued that navigation through websites mimics the associative nature of human memory and information processing (structural isomorphism) and thereby suggesting Web superiority over printed material. Conflicting evidence does exist, as some research has shown that hypermedia increases cognitive load and produces disorientation, implying that the Web would be less effective for learning than would print. Eveland and Dunwoody (2001) compared learning from either printed material or a website and found no differences in learning. Additional findings related to learning from a website also suggests that cognitive load does inhibit learning, as noted previously, but another finding was that high Web expertise facilitates it. In the case of cognitive overload one process or

more will suffer at the expense of the other, and therefore it is essential to understand how individuals process and make meaning for incoming information (Lang, 2000).

Content of the educational online material is essential in preventing cognitive overload and in providing the content in a way that everyone is able to grasp the information. A lot of effort has been made to design educational material in the best possible way, but there is still little guidance from cognitive style or learning style researchers for the practitioner to do this. Clarifying style theory, including both cognitive styles and learning styles, and making better use of it in professional practice should be a common goal. Cognitive style research reflects the work of experimental psychologists investigating the area of individual differences in cognition and perception, whereas learning style research focuses on the process-based issues related to meeting individual differences in the classroom environment (Rayner and Riding, 1997). Distinction between cognitive styles and learning styles is difficult, as the terms have been used interchangeably, according to many sources (e.g., Sternberg and Grigorenko, 1997; but more recent research has shown that they are separate dimensions (Peterson, Deary and Austin, 2007). This paper focuses on defining cognitive styles, as it is crucial to understand individual differences in cognition and perception as individuals give meaning to the presented material in different ways.

The term 'cognitive style' was originally used by Allport (1937), and it has been described as a person's typical or habitual mode of problem solving, thinking, perceiving and remembering. Overall, cognitive style refers to an individual's way of processing and organizing information; Messick (1984) identified nineteen cognitive styles altogether. The two main streams are the wholist-analytic dimension, broadly referring to whether individuals tend to process information in wholes or in parts, and the verbalizer-visualizer dimension, referring to individuals' preference to use either verbal or visual material in processing information. Verbalizer-imager cognitive style has been widely used in learning studies to discover whether verbalizers should be taught with textual material and visualizers with visuals to enhance learning, but the results have been contradictory. Recent studies by Kozhevnikov, Hegarty, and Mayer (2002) and Kozhevnikov, Kosslyn and Shephard (2005) attempted to clarify and revise the visualizer-verbalizer dimension, as they discovered the existence of two different types of visualizers, namely object visualizers (2D) and spatial visualizers (3D). Their revised cognitive style includes three dimensions dividing individuals as 2D visualizers, 3D visualizers or verbalizers (Blajenkova et al., 2006). The main differences in visualizers are that object (2D) visualizers use imagery to construct high-quality images of the shapes and objects, and they tend to encode images globally as a single perceptual unit, which they process holistically, whereas spatial (3D) visualizers use imagery to represent and transform spatial relations and tend to encode and process images analytically, part by part, using spatial relations to arrange and analyse the components. Spatial visualizers don't seem to keep a lot of pictorial details in their images in order to develop efficient spatial transformation abilities, while object visualizers tend to develop an ability to maintain a lot of pictorial details

in their images, which impedes effective spatial transformations. Although these dimensions are relatively independent on structural and functional levels, in many real-life tasks these three systems collaborate; there is also evidence of interferences and trade-offs between them. These also might be cases where verbal and spatial processing interferes, as, e.g., in physics or mathematics, verbal and spatial processing might serve as alternative strategies to approach the same issue. In order not to overload working memory one chooses the strategy in which one is more efficient. Altogether Kozhevnikov et al. (2005) have said that "in addition to being a useful instrument in providing vocational guidance, the OSIVQ [their cognitive style dimension test] could be a useful tool for educators in the development of efficiently targeted teaching methods and a choice of instructional educational materials."

Cognitive styles can be considered to be adaptive control mechanisms without individual awareness, whereas learning styles involve a conscious choice of alternatives (Sternberg and Grigorenko, 2001;. Learning styles on the other hand can be considered from an individual's perspective of "how I learn", or they can automatically be linked with various stages in the learning cycle (Sadler-Smith, 1996, 1998). Online learning provides the possibility of making conscious choices when browsing through the material; one possibility is that individuals tend to make decisions based on what kind of content is easiest for them to understand. It has been shown that online courses held at the university had higher drop-out rates when visualizations were absent, leading to the conclusion that educational material needs to contain a lot of visualizations. This is true to some extent, but Hegarty and Kozhevnikov (1999) and Kozhevnikov et al. (2002) have shown that, for example, object visualizers have difficulty interpreting scientific graphs as abstract schematic representations and instead interpret them literally as pictures. This shows that there is a true need to design versatile content in order to provide individuals the possibility to select the content they feel most familiar with.

## 2.3. Communication Abilities

The third important aspect is communication abilities, as the needs for communication are increasing and altering in nature. Face-to-face communication changes as teachers are becoming more coaches and group work increases, causing the need for efficient face-to-face communication to increase. Children are already engaged in online communication with their friends utilizing various channels, e.g., Facebook or WhatsApp, which is mostly social communication. Motivational reasons to get engaged in social communication depend on an individual's basic needs, which in this case are related to autonomy and relatedness. The use of social media in education has been experimented with, but as it was compulsory for students, it did not work, even though they use it when they are not in school. The reason for this is that, when intrinsically motivated people are controlled by extrinsic factors, they lose interest (Deci, Koestner and Ryan, 1999).

# 3. Formal and Informal Education

Informal education consists of all learning activities happening outside formal education environments. It can be defined as "the sum of activities that comprise the time individuals are not in the formal classroom in the presence of a teacher" (Gerber, Marek and Cavallo, 2001). Informal education captures a great number of different environments under its definition. In this article, digital media defines the environments we focus on.

## 3.1. Internet

For the purpose of this research, the Internet as a tool and platform is regarded as the key game changer, both for formal and informal education. Disruptive new technologies such as the Internet not only change the way we access information, but they also affect the way we think. The Internet has become mundane for twenty-first century society; however, it should be noted how such a technology has changed the way humans solve problems and impacts how they process information. Search engines especially, as trivial as they seem, particularly to digital natives, influence our thinking, as they provide personalized data. Further, search engines such as Google that are structured by various machine learning methods such as algorithms, represent an ultimate external memory which have in a short time revolutionized our problem solving process.

In addition to the Internet changing the way data is gathered and processed, it also impacts how it is shared. Traditional formal education was and is based on books, which are a type of technology that is dependent of the social context of use (Bruckman, 2002). At its core, learning is a social process which can be facilitated by the Internet (ibid). With the Internet, learning is transforming from mere information searching to new, more sophisticated forms of information processing. The students' technological skills, attitudes, beliefs and preferences that are largely constructed outside of formal education "may greatly influence how they learn and how they perceive learning supported by new technologies" (Mao, 2014, p. 222). By studying the technological abilities of individuals in formal and informal educational environments, researchers aim for predictions on how technologies should and will impact human learning (ibid). Currently, the main trend in scholarly research emphasizes the social character of learning. The Internet has great potential to influence learning via online communities and collaboration (Bruckman, 2002).

## 3.2. Online Education

Online education is the form of education provided by entities, educational institutions and companies through platforms based on online technologies. The last years have witnessed the fast-growing success of these platforms. For our purposes, formal

online education consists of courses delivered on learning platforms and provided by universities. In this context, the objective is to obtain certificates and recognition in terms of credits as the outcome of the course.

Computer-based learning has its roots in the early 1960's when a team of psychologists at Stanford University began the first experimentations of computer-based learning. Computer-based learning was developed during the 1970's and 1980's (Hiltz, 1990). After the advent of the Internet, the Open University in Britain and the University of British Columbia were the first institutions of higher education to implement online means of delivering learning activities and distance learning (Bates, 2005). This was one of the revolutions of the Internet: the advent of *education for everyone*. In its first days, online education provided by universities consisted of the creation of online curricula and websites related to the classical courses held at these universities. A university course on the Internet was taught for the first time in 1994 at the University of Pennsylvania. This was the beginning of a new educational paradigm, leading to the birth of the MOOCs, massive open online courses. The MOOCs deliver freely accessible multimedia documents useful for teaching purposes related to the material of the course. In addition to the conception of distance learning, the MOOCs integrate students into an online community. This community creates a virtual classroom for students, where discussions and peer confrontation take place.

According to a survey (Parker, Lenhart and Moore, 2011) the social impact of online courses among deans and graduates of 1,055 colleges in United States has received good feedback. The majority (51 percent) of college presidents think online courses provide the same value. More than three-quarters of college deans (77 percent) report that their institutions now offer online courses. Fifty percent of college presidents predict that ten years from now most of their students will take classes online. Twenty-three percent of graduates report that they have taken a class online. Among all students who have taken a class online, 39 percent say the format's educational value is equal to that of a course taken in a classroom.

Top American universities, such as MIT, Princeton University and Stanford University, have launched their Mooc programs. Even if they offer free courses for a global audience, these do not lead to university credits. Along with top universities, many private entities have emerged, like Codecademy, Coursera, Curriki, edX, Khan Academy, Learnstreet, Udacity and Udemy. In order to understand their common features, we describe some of them.

Khan Academy is a non-profit organization whose website offers users several learning activities and multimedia educational content. The aim of Khan Academy is to deliver free education and create a global classroom. It offers thousands of courses (not held at any school or college) at a variety of levels (from primary school to college) in several languages. The website features videos of the courses (about 4,000 on YouTube) and exercise activities on the related material. Since Khan Academy is non-profit, the business model is based on private donations.

Coursera is a profit organization providing online enrolment in college courses. Coursera has forged partnerships with many top universities worldwide in order to feature current courses held in these universities. Only in a few cases do courses offered on Coursera's website lead to college credits. The courses are featured through videos, and (complete automatically graded) tests and assignments are submitted electronically. The website also serves as a social platform (very similar to a discussion forum), where students might ask and answer questions about the material. The business model of Coursera is based on fees coming from certificates and other agreements with the partner universities. Coursera has already reached one million registered students, though only a fraction of them are active (Young, 2012). Coursera had students registered in 196 countries. The highest proportions are in United States (38 percent), Brazil (6 percent), India (5 percent) and China (4 percent) (Young, 2012).

Udacity is a for-profit company with the same structure and educational offers as Coursera, although Udacity is completely focused on computer science and related fields. Udacity has reached 739,000 students coming from 209 countries: from United States (42 percent), India (7 percent), Britain (5 percent) and Germany (4 percent) (Young, 2012).

LearnStreet offers a platform to learn to program software online. Learnstreet offers beginner courses on Javascript or Python, and students can practice coding in the browser, exploring video tutorials, using a library of Code Garage projects, where they can use existing code to build more involved programs (Silicon Valley Business Journal, 2012). Currently the offerings are free and are funded by the venture capital firm Khosla Ventures (Silicon Valley Business Journal, 2012). Learnstreet also plans to introduce placement services for connecting users with the many in-demand technology jobs in Silicon Valley (Silicon Valley Business Journal, 2012).

From the analysis of all these platforms, we deduce that one of their main common features is the *personalization* of the study path. Indeed, the courses provided by these platforms are divided into different short modules, coherently organized into single short videos. Depending on their own backgrounds, skills and interests, students can choose which part is worth listening to or which part is worth watching again. They might ask and answer questions in the online community of the platform. This is a step toward the creation of a global classroom.

As we have already noticed, these platforms offer the backdrop for courses taken by thousands of students from all corners of the world. One issue faced by these education providers is to manage to grade thousands of tests and homework in order to certificate and grade students' performance. The trend is to use self- and peer-grading, which are very close to teacher-grading (Sadler & Good, 2006).

### 3.3. Micro Learning

Microlearning deals with relatively small learning units and short-term-focused activities (Hug, 2005). These learning activities last from a few seconds to fifteen min-

utes or more. The learning activities typically provide subsequent meaning that can continue over multiple events and over a longer period of time. Some people use microlearning explicitly for learning, while many others do related activities just for fun or for other purposes. Examples of microlearning activities are:

1. Reading blogs and following feeds
2. Participating in short message service (SMS) news quizzes
3. Noticing employer's screensaver campaign on a personal computer
4. Writing and tagging blog postings
5. Making social bookmarks

Microlearning typically takes place in different digital media environments. A typical characteristic of these environments is that they 'push' information to the learners, reducing the need from learners to actively seek information.

But how will microlearning impact education? Microlearning has proven to play an important role in knowledge creation (Job and Ogalo, 2012). People are learning by collecting, observing and combining data. Through microlearning, these activities happen all the time: following an RSS feed is about collecting and observing. Adding tags to blog posts is about combining information. Often these simple tasks are part of routines that happen from one day to another. On a yearly level, these activities can add up to hundreds of hours. Many media technologies allow this information to be documented and structured. Whenever the social aspect is there, which it almost always is, others can contribute to the microlearning process, making it an even richer learning experience. Research has found that when properly used, microlearning can increase students' engagement in the learning process (Wang, Shen, Novak and Pan, 2009).

Microlearning has proven to be highly successful in corporate and other professional training. The benefits of microlearning were discussed above, and it could be claimed that microlearning or parts of it should be adopted as a part of formal education. For example, the support of anytime–anywhere access to learning resources is one relevant property of microlearning that definitely should be adopted in formal learning. This is a strong signal of how digital media is influencing current education.

It is worth noting also that microlearning comes with some negative impacts. The use of media services can lead to increased distraction (Wang et al., 2011). This means that pupils may use less time studying, because they use so much time on social media. Some studies confirm that the use of social media has a negative impact on students' grades (Boogartl 2006, Jacobsen and Forste, 2011). Similarily, it has been found that other areas of digital media such as games and television have a negative impact on students' grades

### 3.4. Social Media

One form of microlearning, social media, is characterized as a user-generated platform in which consumers mainly discuss with one another (Bernoff and Li, 2008).

In 2013, 87 percent of sixteen-to-twenty-four-year-old Finnish consumers had been using social platforms during a period of three months (OSF, 2013). Such statistics suggest that the social media consumption of the generation of digital natives likely will increase.

Different social media platforms, such as weblogs, allow students to interact with and learn from one another (Kelm, 2011). "Peers can be a powerful resource for children's learning, if activities are structured to promote productive interactions" (Bruckman, 2002). Social media enables collaboration, enhances the connections to the real world and is therefore a great addition to learning tools (ibid). Social media platforms, such as Facebook and Twitter, have been increasingly scrutinized for their potential to impact both formal and informal education. In one such study, teenagers who had been using social media such as Bebo or MySpace predominantly were found to create new accounts and shift platforms to Facebook as they were preparing for their university studies (Madge, C., Meek, J., Wellens, J., & Hooley, T., 2009) "Their move to university was associated with Facebook emerging as the dominant SNS" (Madge et al., 2009).

The study of Madge et al. (2009) as well as peers such as (Mao, 2014) have however found that with the current abilities and associations of students related to social media platforms, the potential seen in their usage is primarily seen as informal. As Madge et al. (2009) describes:

> *First year undergraduate students generally thought the use of Facebook was most importantly for social purposes, secondarily for informal learning purposes (i.e., for student-to-student interactions about academic work-related matters) but definitely not for formal teaching purposes (i.e., between staff and student and involving formal assessment).*

If teachers want to use social media for educational purposes, according to students, they should avoid some clear mistakes, such as considering YouTube videos to be pointless (Mao, 2014). Also, students "criticized failed attempts to use social media when teachers do not provide feedback or interact with them during the process" (ibid). Therefore, it is no surprise that Bruckman (2002) suggests that we should emphasize those technologies that promote creativity and students' thinking.

The current body of literature suggests that further research should be conducted in order to discover further knowledge regarding the use of social media for educational purposes. Questions such as 'Does the use of Facebook vary with disciplinary background, social capital, ethnicity and access to computing facilities?' and 'How might these digital inequalities then impact educational achievement and development of social networks in everyday lives?' are still left unanswered (Madge et al., 2009). Despite the fact that studies have shown only poor experimentation of social media for formal teaching purposes, the evidence from successful informal experiments suggests a potential for change. For the purpose of this chapter, we define

occasions of informal learning as situations in which students have been motivated by their ability to learn from peers via social networks such as Facebook or blogs.

### 3.5. Games

Any form of play or sport which is played according to some rules and evaluated by skills, strength and/or luck in a competitive environment, is termed as a game (Oxford Dictionary, 1998). The use of games in education holds great promise, as many aspects of educational experiences are closely related to a game. Students have a series of assignments for which they are rewarded with grades (Schell, 2008; Whitton, 2012). Due to this fact, evidence proves that games have the potential to support education in a variety of contexts, from primary and secondary schools (Bottino, Ott et al., 2006; Suh, Kim and Kim, 2010; Watson, Mong and Harris, 2011) to universities (Connolly, Stansfield and Hainey, 2007; Ebner and Holzinger, 2007; Whitton and Hollins, 2008) and adult education (Kambouri, Thomas and Mellar, 2006).

The idea of learning through games is associated with the fact that students learn in different ways and that they learn many things outside the schools, often via access to digital media and online community or social media (see Section 3.4). This type of learning outside the school matters a great deal to a student's ability to learn in school; therefore, games could be one way to attract some students' attention inside the schools (Salen, 2010).

One tremendous benefit of games is that they promote cognitive skills. One such skill is called 'situated cognition' or 'learning by doing' (meaning teaching a concept in the environment where students can practically demonstrate that knowledge). Research has shown that the use of situated cognition for education purposes promotes learning, students learn faster, retain knowledge longer and transfer that knowledge to the real world (Van Eck, R. and Global, I, 2010). Another thing that games do very well is promote systems thinking, for example, Simcity (Adams, 1998). Games like Simcity and similar others help to understand the system behind the interface and think of the game not as a set of discrete items but as a system. We learn how to interact with different items assuming that these are part of the whole not just single or separated items. This is the type of thinking expected from education, however is not seen in any of the educational experiences so far. Another way that games are very effective is that games promote collaboration (which also often called as 21st century learning skill) (Sanchez and Olivares, 2011). World of Warcrafts is one of such multi-player online role playing games build on this concept where thousands of people work together (Song & Lee, 2006). Sociologists and educators consider this game as an excellent example of collective intelligence and social negotiation of skills (Golub, 2010). People working together to solve a problem, that could not be solved individually. These types of skills set are highly required to solve real world problems, for example shortage of oil, energy crisis, hunger and poverty. A further well studied benefit of games is that they develop problem-solving skills. Dave Jonassen argues that the heart of a good instructional problem has two key characteristics. One it has

a goal that requires to generate new knowledge in order to solve the problem. The other part is the value to the learner in solving that problem (D. H. Jonassen, Howland, Moore, & Marra, 2002; D. H. Jonassen, 2002; D. Jonassen, 2009). However, schools include the first part sometimes but never consider the second part. Finally, another important aspect of games is that these introduce engagement (Van Eck, R. and Global, I, 2010). Many people have misperceptions about what actually this engagement means in terms of games (e.g., it is about fun, entertainment and/or motivation). It is actually a cognitive effort required to solve a problem. More intuitively the engagement is a combination of problem solving and optimizing the challenge. In other words, it is an example of individualized instruction.

Although there are many benefits that games offer in educational experiences, there exist key challenges. One of the challenges is the feasibility and applicability of games in classrooms. Games are the disruptive technologies meaning that they expect us to operate in the same way they are designed to be operative. For instance, when we talk about situated cognition or authentic learning we have to recognize that we have 30 kids, say, in the classrooms and situated cognition would mean field trips or lab experiments after every hour of the day. Similarly when we discuss about systems thinking and collective intelligence, in our current educational model it is regarded as cheating. The educational experiences emphasize in doing own work and generally do not allow communicating and collaborating with others in the classrooms especially during the examination (Van Eck, 2006). A further challenge is the concern about competition, rewards and incentives. Usually the parents are worried with the notion that when the games do not progress, their children get addicted and the only thing children would like to do is to get better and better (Salen, 2010). Another challenge is the training of teachers. Learning through games modifies the role of teachers from instructor to coach. Teachers require a special set of skills and training in how to use games to teach students.

# *4. Schooling System*

## 4.1. The Finnish Education System

The Finnish education system is based on the ideology that all people must have equal access to high-quality education. Key values in education policy are quality, equity, efficiency and internationalization. The basic educational system aims to provide consistent results and equality. The Finnish education system is free (tax paid), and it consists of a compulsory nine-year primary education (comprehensive school) for the whole age group from a child turning seven years old. This is preceded by one year of voluntary pre-primary education. Upper secondary education consists of general education and vocational education and training. Higher education is provided by universities and polytechnics. Education is guided by legislation, national core

curricula and qualification requirements. Teachers are recognised as keys to quality education, and the high level of education is based on university level teacher education; meaning that teachers are highly educated- at university level- and this in turn insures high level of education to kids. The teaching profession is regulated, and the qualifications required from teachers are defined in legislation (FNBE, 2011).

In the future, Finland wants to lead in the development of learning culture. The strategy of the Finnish National Board of Education (FNBE) aims at developing into a centre of expertise in the use of information and communications technology in education and digital learning environments. The goal is for learning and teaching to emphasise collaborative approaches, combined with building knowledge. All learners will be guaranteed equal opportunities to access and produce information and to make efficient use of information and communications technology in support of learning. Electronic learning materials will form an integral part of learning. Digital infrastructures and digital skills at all levels of education will be developed systematically. New educational technologies and learning environments will be put to active use in teacher education. Databases will be developed to support teachers. Finnish teacher education will be developed to include the utilisation of information and communication technology (FNBE, 2011).

Some schools in Finland are practicing new methods where instructors work more as coaches than as traditional teachers, and students may do homework at school and learn from lectures at home through online videos.

## 4.2. Growing Demands for Teachers

Learners need to develop critical technological and communication skills needed for the twenty-first century. Future teachers must be able to teach new literacy skills ~~in~~formation, media and technology literacy. Pupils must be taught how to find and collect reliable information and data and how to make sense of it while thinking critically. Historically knowledge was scarce: teachers read aloud, lectured, dispersed their knowledge to unknowing learners. Pupils memorized facts and figures and retention or this memorized knowledge was tested. Now content and information is found on the Web, and using search engines is so commonplace that Googling has become a verb. What will be important is not memorized knowledge but how well and fast a pupil collects relevant information, what is deducted and how this knowledge is applied. Future teachers will be more like coaches of content (Järvilehto, 2009).

Information technology skills are important for future teachers as well as for learners. Children become adept in the use of technology and ICT, and therefore teachers must keep up with new technologies that children will embrace fast. This must be considered in future teacher training. In Finland less than 10 percent of applicants gain entrance to university teacher training. Finland's high scores in Pisa tests have been attributed to the high level of teacher training, free education and uniformity of the curriculum. But teachers may refuse to use new technology in their teaching. In the Education Minis-

try's future plan (OPM, 2007) is mentioned only in passing that nationwide training programs at university level are needed for teachers in subjects such as new technologies. To remain at the forefront of education, new teachers must be well-versed in computer skills, and these should be a major subject in teacher's training (OPM, 2007). A global ecosystem of collaboration among educational institutions and educators will be needed to keep Europe competitive as the population ages.

Global trends in education and the use of ICT affects teachers everywhere. Song (2010) writes that China, where educational reform is ongoing, could become a leader in designing teacher education programs. To produce highly qualified, future-oriented and ICT-savvy teachers, designers need to shift to a transdisciplinary curriculum. Teacher education needs to embrace innovation which includes an emphasis on global collaboration via the Internet.

Communication skills that can be used globally are important. Sanna Lukander, an educational expert and exporter of Finnish primary education from Rovio Entertainment, emphasizes the need for global communication skills to be taught to both teachers and learners. She also predicts that peer learning ~~on~~ a global scale ~~wi~~ll increase as the digital world supports collective doing.

Kati Tiainen, an education expert from Microsoft, also stresses the importance collaboration in learning, in producing content and in teaching. She says twenty-first century skills focus not so much on what is in the curriculum but on how learning happens. Learning will be more personalized, tailored to pupils' needs, interests and strengths. She also emphasizes that teachers will become more like coaches.

Järvilehto (2009) writes that collaboration and communication can be taught through games and ICT. In the future, the learner will also be the creator and producer of content, often in a collaborative way. Schools should teach ways of working together to produce, share and communicate information and other content. The author emphasizes the need for learning to be fun, enjoyable and meaningful for learners.

We are transitioning from classical lecture-learning to facilitated learning in which students take more control of their learning process. The trainer's role becomes that of a facilitator and coach. But not only does the teacher's role change, so do the subjects that need to be taught, as described in the following.

### 4.3. Rising Awareness

Different social platforms are used to facilitate learning. However, the primary purpose of these services is something other than learning. It is more about implementing a business goal that can be pretty much anything from targeting ads to gathering direct marketing contact lists. For students, it is important to understand that these business goals can differ from their learning goals, resulting in undesired effects. Examples of these effects are:

- Twitter does not forget: the U.S. Library of Congress is archiving all Twitter use. This means that whatever gets tweeted cannot be untweeted or deleted. One

must be careful about what is morphed from your personal life into the cyber world, which may exist digitally forever.
- Social media leak information: social media services often have closed groups for professionals or study groups. These closed groups often give consumers a sense that these are exclusive environments. But they are not. The boundary between public and private is incomprehensible for many (Rosenblum, 2007).

The above companies are not trying to be intentionally evil to students. Unfair or deceptive companies are hunted down by various legal systems around the world. But a great majority of different privacy incidents are not privacy incidents from a legal perspective, rather just from a personal viewpoint. For example, private information shared on Facebook can become public, and it may not possible to remove this information afterwards. People feel that their privacy has been violated, because, e.g., they can be bullied at school for something they have said, and they cannot deny it, since it is 'on the Internet'. These incidents happen for the simple reason that students are not aware of services' functionality, even they are very well aware of how they are using the service. When the functionality differs from the students' own use, different privacy 'violations' are possible. But, as said, these privacy violations are usually so-called personal privacy violations, not legal privacy violations and rarely result in any legal action.Understanding these aspects of data retention, confidentiality, use of the data and other related issues is a necessity for the efficient use of media in education. This calls for raising awareness around these concepts amongst students. The key in awareness building is to help students understand what kind of potential threats there are and what impacts may result. Of course, it will not be possible to explain all possible causes and effects to students, but the key is to help students make informed decisions regarding the use of media services. The schooling system should bear responsibility for students' awareness creation towards privacy and other related aspects. Students need to learn to protect themselves and others from harmful content and behaviours online (Andrews, 2013). This calls for the use of common sense to review what they post and review what is available on the Internet about them (Rosenblum, 2007). Developing such critical thinking and responsible behaviour regarding their online behaviour would be a valuable asset for the students. But currently the schooling system fails to build such a skill set for students.

## 5. *Methodology*

We have approached the research problem through a literature review (as described in previous sections) that serves as a source for defining signals. A 'signal' is a small or local innovation or disruption that has the potential to grow in scale and geographic distribution (IFTF, 2014). At the time of an identification, this signal is still too incomplete to permit an accurate estimation of its impact and/or to determine its

full responses (Ansoff, 1982). Signals are useful for anticipating an uncertain future. Using signals, emergent disruptions can be captured before they become obvious. Trends ("a general direction in which something is developing or changing" (Oxford Dictionary, 1998) are usual methods to describe something obvious, and signals could capture a trend before it is identified and acknowledged. The identified signals were used to draft a simplistic scenario for the future of primary education. The scenario describes a prediction of how the identified signals are shaping the world. The goal of the scenario is not to be rich in details, but to be brief and to present views that can be supported by the identified signals. To test the validity of our scenario, a number of expert reviews were conducted. The goal of the interviews was to gather feedback from media professionals that have made their own predictions regarding the future. The interviewees were presented with the suggested scenario from this case and asked to provide their opinions on the scenario and the building blocks of the scenario. The expert feedback was incorporated selectively: some pieces of the feedback could have been integrated directly to the proposed scenario, whereas most of the feedback was noted and possibly used to draft an alternative scenario. Based on this methodology, we will forecast "a day of a Junior in 2025" in the Finnish schooling system.

# 6. *Future of Education*

## 6.1. Signals

As described above (see Section 5), signals have the characteristics of disrupting or innovating the course of present predictions of the scenario. As used by the Institute of the Future (IFTF) signals are practical foresight tools that make it possible to map complex horizons for the future. Signals can take into consideration the technological, social, political and environmental factors of a horizon. In the present paper, a total of fourteen signals were identified from previous research (see Sections 1–4) as well as from the expert interviews. In Table 1 we disclose the list of signals and provide a brief description for each. The following section will then predict the behaviour of the signals.

**Table 1.** ***Signals to the future of education***

| Signal | Explanation |
|---|---|
| Peer-reviewing | Automated scoring and peer reviews for grading |
| Personalization | Recommendations for students based on interests, background and aims, predicted with big data |
| Self-reviewing | Students will assess their own skills according to given criteria |
| Collaborative learning | Learners will collaborate in projects and homework within their own classes as well as globally with other students |
| Self-organized learning environment (SOLE) | A place where children can collectively access the Internet and pursue their learning interests |
| Microlearning integration to formal learning | New teaching methods in which microlearning is a seamless part of the formal learning experience |
| More technological motivational rewards | Badges, tools and others, such as level ups from games used to motivate students |
| Games-based learning | Learning will become more fun-oriented; games will be used more and tailored to the needs of education. |
| Global classrooms | Cooperation of classes by use of new technologies regardless of geography: global curriculum |
| Rising awareness around privacy: a new skill to learn | Fundamentals of coding and online privacy issues are taught as part of the curriculum. |
| Reading printed books | Printed books will not be used in teaching; all literature will be delivered through the Internet and other technologies. |
| More attention will be paid to the design of educational material. | The interplay of visual and verbal material will be better balanced. |
| Social media | Teachers will learn to incorporate changing social media (informal learning) into classroom learning and peer teaching. |
| Communication skills | Teachers will coach students in collaborating and teamwork in class as well as across geographical borders. |

### 6.2 Behaviour of Signals

Our prediction is based on the following behaviour of signals drawn in Fig. 1.

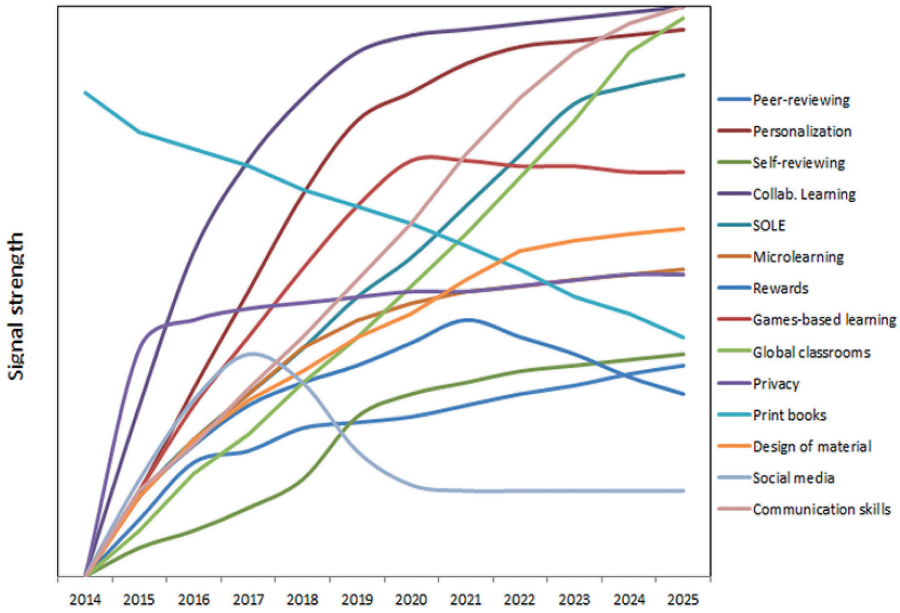


**Fig. 1.** ***The Changes in the Strength of signals***

As one can observe from Fig. 1, the strongest signals are global classrooms and students' communication skills, while the weakest are printed books and self-reviewing. The changes depict how the primary schooling system will advance towards a future in which the teacher's role shifts from pure ruler to being a coach. At the same time, the students will be learning in an environment in which they will be provided with personalized learning materials and in which teamwork and communicating with peers will be integral parts of the learning experience. Based on these evaluations of signal strength, we have developed the scenario of "a day of a Junior in 2025", described in *"Junior's day at school in 2025"*.

## 7. Conclusion and Discussion

The Finnish primary school system is not the most efficient system when it comes to teaching necessary skills to twenty-first-century learners. The media and parents merely discuss the alarming behaviour of distracted children playing with their smartphones at school. However, the topic of discussion should be "What could we do to

improve the school system to avoid distracted behaviour?" We believe that the existing school system should develop in such a way that it would support the digital savvy youngsters and engage and motivate them by leveraging their technological skills.

Currently the school system cannot be described as engaging. New ideas are needed to transcend the boundaries of formal and informal education by combining traditional methods and new innovative ideas. The school system must change from pushing to coaching. Right now the teachers are spending most of their time in lectures (i.e., pushing information). The system should support individual learning, not 'the same for everybody'. School days should include more projects that would encourage communication and social interaction. Various media technologies play a key role in delivering these changes.

In summary, we emphasize that the current educational system should change from classical teaching to facilitated learning. In this regard, we present a detailed scenario predicting a typical school day of a Junior in 2025 (see scenario in *Junior's day at school in 2025*), in which we project our signals to forecast the activities of a Junior during a typical school day in 2025.

Through these simple school-day examples, we propose that the schooling system in Finland must change and that various media technologies will be the key to facilitating this change. There are many good qualities that shall remain with the existing schooling system. The purpose of technology is to support this system, not to be the sole solution. But, due to the fact that there are many open gaps in the research to integrate the schooling system with various media technologies and that these technologies present a significant part of everyday living, this will require a major change. Big changes always take a long time, and therefore it is necessary to start the change now.

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# Transparent Media Driving Spaceship Earth

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**Abstract.** In our everyday life, we are surrounded by events and phenomena that are difficult to explain or comprehend. Despite significant advances in many scientific fields and abundant availability of data on many aspects of our life, it is still a challenge to communicate slow and complex global processes to the average citizen. In this chapter, we study problems of explaining such processes in the media and look into the future for solutions. We take climate change as a case study and look into how the media can communicate the importance of the issue to the population, and transform simple awareness and high-level knowledge into rational action directed towards solving the problem. We observe signals in technology, media and society

to present possible outcomes for the future development of media, and provide our optimal path for development.

**Keywords:** Media, Big Data, climate change, reporting

## 1. Introduction

The idea of Earth as a spaceship was presented first in the end of the nineteenth century in Henry George's book *Progress and Poverty* to describe the limited resources on Earth. The human race is the passenger on an isolated spaceship which is travelling through space, and it has to manage the resources it has on board. Later on, the term was used to illustrate the seriousness of climate change and the importance of conserving the fragile atmosphere protecting the passengers on the ship.

Climate change is a typical example of a slow and complex process going on perpetually in the background of everyday life. It has diverse roots in all parts of society and the economy, and its consequences on environment are challenges for the whole of mankind. One way to view the feedback loop of climate change is shown in the information–impact loop of Fig. 1. Even though the loop in Fig. 1 is labelled with terms relating to the environment, the same principle can be applied to slow processes in other disciplines.

Fig. 1. describes an information-impact loop. For more immediate processes the loop is iterated more frequently, whereas, with slow processes such as climate change, the time scales are so long that the loop does not function properly.

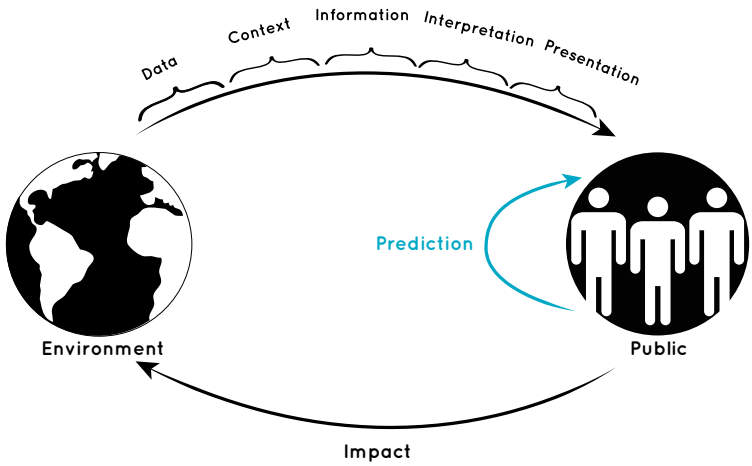


**Fig. 1.** ***Information–impact loop. Information relating to the environment is delivered to the public by the media. This information, in turn, affects people's behaviour, and, further on, it has a second-wave impact on the environment. When it comes to slow and complex processes, due to the limited human lifetime, this loop becomes discontinuous but can be enhanced with predictions.***

Living in the digital age, we are surrounded by a sea of information, and the rate of continuous data production is faster than ever. New information technology tools make it easier to derive knowledge and understanding from information. The current trend of increasingly accumulating data is also evident in the growing amount of available open data. Many governments and other groups are opening their data, i.e., sharing the data in a standardized format. Yet there are still few economic incentives for private companies to open their data: enclosed data is often a valuable business advantage. Smartphones provide vast quantities of data to individuals concerning their behaviour in the digital, and increasingly also in the real, world. We witness the rise of mobile media access, social media interactions, as well as the movements such as 'quantified self'. In general, data is becoming a more essential part of societal discourse, business and media. That is why some refer to the period since 2001 as the Big Data era.

Media and reporting are facing a particular set of challenges and opportunities in this era. Namely, the newly available data changes the role and the definition of a journalist and redefines the rules of reporting. It also disrupts the business models of current media, which poses a challenge to traditional media. On the other hand, greater amounts of open data combined with new technology enable faster and more precise news reporting, the incorporation of relevant social and personal aspects to news, and novel ways of storytelling.

In this article, we discuss in detail the challenges and the opportunities that big data afford the media through a particular example of climate change reporting. Namely, we first go into current media issues that are relevant for reporting complex processes such as climate change. After that, we identify current technological and societal trends that we think provide opportunities for resolving identified issues. Finally, we describe desired possible future scenarios. We choose to describe the desired future scenarios inspired by the conclusion from Curran (2010) that "one should not only passively predict the future of journalism, but also seek to actively shape the future to have a better outcome."

In Section 2, Current Issues in Reporting, we identify five problems in reporting slow and complex processes, using climate change as an example. In Section 3, Current Trends in Media and Technology, the reader is introduced to the current issues and trends in media and novel technological advancements that are likely to change the reporting of slow and complex processes. Data processing and visualization techniques, data journalism, hybrid media, augmented reality, and digital maps are trends and technologies that can help people to conceive the digital world and navigate in the sea of information. Based on the assumption of increased media transparency, in Section 4 we present visions of the future. These visions illustrate how new technologies and media trends can help people to achieve better knowledge, understanding and reasoning of the slow and complex processes onboard Spaceship Earth. This is very likely to inspire actions to change the direction of such processes, in our case climate change. In Section 5, we offer final discussion.

We stress that novel media can be used to concretize complex phenomena. With respect to the case of climate change, the media has the potential to educate people about sustainability and the limitations of the Earth. We describe a new type of media that can actively engage people to take action for the environment and to become proactive actors in sustainability. On a more general level, a described scenario can lead to increased global consciousness.

## 2. Current Issues in Reporting

Using climate change as an example of a slow and complex process, we have identified five main issues in traditional reporting which act as *bottlenecks for* comprehending the problem and relevant causalities. There are several, partly overlapping, issues that make climate change a good example.

### 2.1. Shifting Baselines

Climate change as a process is slow. The changes that occur in the lifetime of an individual are so small that they are hard to notice in everyday life. This problem is described as 'shifting baselines'. People do not have reliable personal and emotional recollections of the baselines from the previous generation, so they do not experience changes themselves but learn about them from reports and studies in a less engaging manner.

A good example of shifting baselines is the sport fishermen on Key West, Florida, shown in Fig. 2, happy about their catches despite the fact that the average size of the fish has decreased 88 percent since the 1950's (McClenachan, 2009).


**Fig. 2.** ***The catches of the sport fisherman have decreased over 88 percent since the 1950's. Still people look as happy in the photos. Pictures from McClenachan (2009).***

## 2.2 Slowness of Feedback Loop

The impact of the choices an individual makes today becomes visible in several years' time. Linking the visible impacts to the consequences reliably takes several years on top of that. For example, it took almost a decade to scientifically prove that increased floods are a consequence of anthropogenic climate change (Pall, Aina, Stone, Stott, Nozawa, Hilberts, et al., 2011).

## 2.3. Cumulative Actions

One reason for the sluggishness of the feedback loop is that the contribution of an individual action is small: cumulative actions matter, and actions cumulate slowly. It is impossible to prove causality on an individual level, even though the causality might be clear on a population level. Collective behaviour leads to the bigger impact. The majority of $CO_2$ production is a result of the lifestyle choices of numerous individuals in Western countries. Still, people do not appreciate their own contribution to this development.

## 2.4. Conflict of Interests

There are groups that openly claim that no climate change exists. There will always be such groups, but the amount of media attention and political power they have is crucial. Many industries have huge lobbying and economic power, and their interest lays in short-term economic gains rather than the sustainable use of natural resources and the atmosphere. Right-wing think tanks promote the belief that there is no climate change or that its consequences are minor. These think tanks are often funded by industries for whom the solutions to climate change will be harmful (for example, Koch Industries) (Brulle, 2013).

## 2.5. Media Bias

Current media reporting on climate change diverges strongly from scientific consensus. Media tend to report the most shocking scenarios. The search for a catchy headline often hinders the reporting of the most relevant news with the most informative value. The different interest groups, discussed above, also affect the reporting.

There are many ways the media misrepresent facts about the climate change. The following list contains some types of bias that influences media.

- **Corporate bias:** Some media houses have an economical interest for not reporting climate change truthfully. This is especially true for media houses that are owned by corporations whose business would suffer from people reacting to climate change.
- **Mainstream bias:** Media tends to report on issues that are currently mainstream. Climate change becomes relevant for the media only when something related to it is happening.

- **Sensationalism bias:** Shocking and sensational news sells better than informative and profound articles. Media also tends to exaggerate.
- **Concision bias:** It hard to show all aspects of climate change in a concise way.

Fig. 3 shows how climate change reporting in media differs from the scientific consensus.

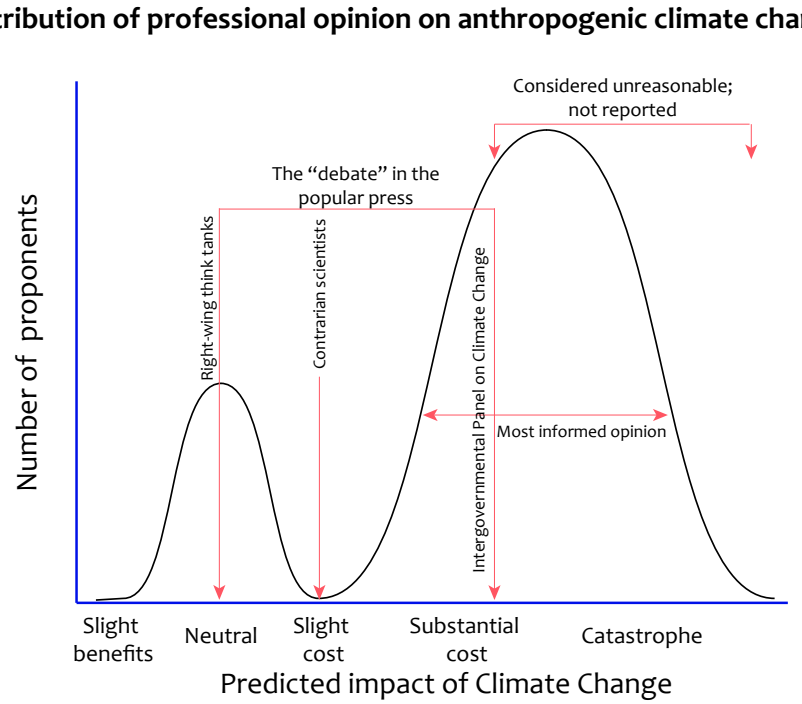


**Fig. 3.** ***Distribution of professional opinion on anthropogenic climate change. Figure shows that media tend to report only some kinds of opinions. Picture from Tobis (2010).***

# 3. Current Trends in Media and Technology

## 3.1. Data to Journalism

As we capture more and more aspects of our (digital) lives, we are bound to have exponentially increasing amounts of data. While this presents an opportunity to have better measurements and improve our decision-making, such development also calls for advancements in technology and human competences. In 2012 data science was dubbed "The sexiest job of 21st century" (Davenport and Patil, 2012), and, as we ac-

cumulate more data, the demand for the workers able to analyze it increases (McAfee and Brynjolfsson, 2012).

In terms of technology, in spite of the recent progress in affordable tools to analyze big data (McAfee and Brynjolfsson, 2012), we are far from being able to deal with all the data. One of the key concerns is that most of current data is unstructured, in different formats and hard to verify. Lack of technological standards and sharing practices causes chaos and uncertainty, which results in a flood of data and information asymmetry. While there is no immediate expectation of standardizing data formats or creating interoperability with concepts such as Linked Data, some universal modes to deal with data are bound to emerge with the increased need to process it.

Effectively using multiple data-sources is essential for several reasons; understanding and describing the dynamics of complex situations, finding solutions to complex problems, and making those approachable and understandable to laypeople all require several types of data. Since non-experts generally focus on static, easily observed components of complex systems (Hmelo-Silver, 2004), good visualization can give viewers a deeper understanding of the behaviours and functions of a system.

Data journalism, i.e., using digital data to find and tell stories, makes it possible to display a vast amount of information in a compact way. It has gained importance in recent years and is often referred to as a significant new tool for journalists. Data journalism provides additional possibilities for deepening a story, adding verification and context, engaging the audience and enhancing the presentation (McCandless, 2009). It is, as well, a tool for the diagrammatic way of conceiving, wherein the information attached to the written story is an essential part of the message (Thrift, 2011).

We assume that a surge in competence of data analysis and some availability of tools is bound to spill into 'general public', going beyond data scientists and journalists. We have already seen examples such as Wikileaks (wikileaks.org) that represent the involvement of unlikely groups in reporting. Some organizations successfully use crowdsourcing to involve the general public in a range of tasks, from contributing to innovation to discovering new planets, as NASA does (Gustetic, 2014). Much crowdsourcing activity is based on data which the organizations decide to make publicly available.

We can assume increased participation of organizations and individuals in the more global and complex processes, through the available data, technology and competence. Co-creating also has the possibility of engaging the crowds. This would mean increased transparency in reporting, as well as better understanding of complex problems that are usually hard to comprehend for a single individual. To paraphrase, crowdsourcing lets us see 'the wisdom of crowds' in action.

New technologies cause traditional news reporting to become increasingly automated (Oremus, 2014), and crowdsourced (reddit.com; twitter.com). This is causing a journalist's job profile to slowly shift from being the first to report something to explaining what certain developments actually mean in the bigger picture, as well as verifying data. Many major news outlets have restructured their workforce in order to

reflect these changes, which are in turn having a direct impact on transparency, data handling, and accountability on a general level (Gray, Chambers and Bounegru, 2012).

Data journalists can create relevant reports and infographics, which are interactive, up to date, transparent and even personalized to the reader. This requires using programming to automate the process of gathering and combining information from various sources in order to find connections between hundreds of thousands of documents. More traditional journalistic expertise, such as instinct for news value and design skills, is also required.

Current state of the art examples show only a glimpse of what we can expect from data journalism, as the field is constantly developing. There is yet a lot of room for improvement and innovation, with journalists and news companies shaping standards and starting to cooperate with each other and with scientists.

## 3.2. Trends in Technology

When it comes to media and reporting, the Internet itself continues to disrupt the landscape. For the first time the Internet has enabled sharing of information in a many-to-many manner and with open data; it allows anyone to be a producer of content and literally to reach anyone else with a connection to the Internet. In such a situation, vast amounts of data and discussions are available online, and it becomes a challenge to navigate such a sea of information. We see emerging startups that try to tackle the challenge by providing adaptive content delivery channels (for example, pulse.me and Paper by Facebook).

Another media challenge for users is comprehension and linking of the pieces of information available in different formats and through different services. In this case, we also see startups trying to tackle the challenge by creating and, importantly, inviting the audience to also create iconographic, mapped, and video digest reports (such as meograph.com). Considering the situation described above, we identify a couple of trends in technology that are most likely to disrupt media and reporting in the future: (1) contextual computing, (2) next-generation user interfaces, and (3) information visualization.

The adaptive (personalized or situation-dependent) media content delivery channels are part of a recent, larger trend in ICT contextuality. Big data, in particular user graphs and digital maps, enable such development: geotagged pieces of information can be delivered to a user's mobile device (or any ubiquitous type of device) when they become relevant. Contextual data enable smart service delivery. In the near future, contextual computing is expected to take the leading position from mobile technologies.

Georgia Tech researchers Abowd, Dey, Brown, Davies, Smith and Steggles (1999) defined and discussed the applications of contextual computing more than a decade ago. Traditionally, four main contexts are defined for an individual:

- **Social:** consists of social circles of a user
- **Personal:** includes deep-rooted beliefs, health situation and emotional aspects

- **Interest:** preferences, choices of a user in diverse circumstances
- **Behavioural:** product of user past, current actions and habits

There are already companies maintaining large social graphs (such as Facebook), or behavioural graphs (such as Amazon recommendations), or combinations of those (such as Netflix) for their customers. For the purposes of our article, we would like to introduce the fifth relevant context:

- **Environmental:** factors via which a user is affecting the environment and climate change (for example, Tesla and Nest users' data)

Obviously the four previously described contexts are influencing the environmental context. However, we think that a necessary feedback loop about the environmental consequences of individuals' actions is lacking at the moment, and this is what introducing the environmental context can alleviate. For instance, if you know how your energy consumption influences the climate, one might hope that you would change your behaviour. Or, if you know that some of your friends are influencing your environmentally unsustainable actions, you might even choose to change the social context. We find that the current trend of establishing such an environmental context and thus the missing feedback loop is one of the most relevant challenges when it comes to the future of reporting complex phenomena.

Combining data from different contexts offers amazing possibilities to enhance individuals' lives. Linked Data, which we introduced at the beginning of the section, enables the combination of different contextual data in original ways. Thus, we already see a rise in applications which combine a number of different contexts for an individual and augment the user experience in completely novel ways. Data collected by applications have the potential to create mobile applications that are 'aware' of what the user is likely to be doing at any given moment, even if they are not actively using any device. The applications can even take a proactive role of predicting possible future user actions and warnings in case of need.

Coming back to media, we have already given examples of media startups that embrace an advanced utilization of the context of interests, either by itself (pulse.me) or in combination with social and personal contexts (Scoopinion.com and Paper) in order to enable precise delivery of relevant information. Individuals can achieve profound understanding of complex phenomena with repetitive learning. Contextual technologies also can be used in engaging learning where the application gives pieces of information to the user in the time and place where the user can find the information relevant and interesting.

Next-generation user interface (UI) technologies include augmented reality (AR), gesture interfaces, tangible interfaces, and many others. The promise of such UIs is that the interaction with a single computer interface is replaced by multiple interfaces in combination with real objects, thus blurring the lines of traditional reality and virtual reality. Reality is augmented or completely immersed in computer UI. It is

clear that the starting point in actualizing such advanced technologies is the design and sophisticated visualization.

Some of the aforementioned next-generation UI technologies, such as AR, have been developed in recent years and presently reach first consumer applications. Others, such as tangible interfaces, have been in R&D for a decade already, but are still waiting for breakthrough applications to appear in the consumer market. It is inevitable that such novel UI will drive a large transformation in the *society*, which will greatly affect fields such as media and reporting. Media will be perceived as more seamless, and thus it has the potential to make users more engaged. The ubiquitous computing environment will expand the borders of what we perceive as media, resulting ultimately in more time people spend interacting with it.

If games are combined with AR technology, we see enormous possibilities for connecting people to their surroundings and for raising their awareness of reality. For example, there already exist games in which people can see how their community will look in a hundred years, assuming that current behaviours and rate of carbon emission continue or given a particular set of changes in their collective behaviour (Klopfer and Sheldon, 2010). Games as a learning method are drawing interest in science education (Rosenbaum, Klopfer and Perry, 2007), and they could be particularly useful in educating kids and students about climate change.

Finally, data visualization is crucial to helping users understand the message contained in the data. Information has to be in an easily conceivable format so that the user doesn't get bored or too perplexed. Considering the wealth of data available nowadays, it is visualization technologies that have promise to help navigate that abyss. The power of visualization is not only in presenting the data, but it often helps as the first step insight into what kind of analytics could best be performed. Besides representing complex datasets in ways that take into account the limitations of human cognitive capability, visualization also can be applied to existing and seemingly simple concepts to bring a new viewpoint and thus enhance human understanding from diverse perspectives. The fact that some of the most valued visualizations up to today originated in the nineteenth century (Tufte, 2001) shows that this field has unused potential to improve and catch up with the trends in the Big Data era.

## 4. *Visions of the Future*

Based on the trends and signals presented in the previous section, we construct a scenario around how climate change reporting might develop in the future. Our scenario is based on an assumption of increased transparency and awareness turning into action more frequently.

## 4.1. Living in a Transparent World

Currently the EU and USA have initiatives to open a large amount of government data to the public and standardize it so that third parties can use it. Governments opening up the data would further advance transparency trends. Government-provided data can be even more useful when combined with other sources and types of data. It is not reasonable to expect that data-sharing practices will change overnight, but the recent willingness of some corporations to share their data indicates that the direction is also the same for companies. Increase in transparency is expected, especially in the non-core areas of the business, such as sustainability and climate change data.

However, research points out that unless the process includes mechanisms that would allow others to access the data easily, process it and actually act on findings, opening data would only increase the bureaucracy inside organizations providing the data, while having no effect of accountability (Wong and Welch, 2004). Thus, technology and data in itself do not solve the problem if a system facilitating accountability of those reporting the data is not in place. Therefore, we assume that, in the future, transparency of data would be accompanied by the right environment to use the information and actually make a difference by reporting it through media to individuals. Potentially, transparency in data and media would address the problems of shifting baseline, slow feedback loop and cumulative action. Provided that data would be open, it would be easier to track down individual actions and simulate consequences, based on a rich data from the past.

We predict that by 2020, sustainability reporting will still not be widespread, or standardized in any manner. The data that companies share generally come in the form of written reports and summary presentations, which highlight some figures. However, they resemble a public relations gesture rather than an accountable report. Some large companies may employ open standards (e.g., XBRL GRI) suggested by bigger audit companies, as those standards are starting to gain popularity.

As reporting spreads, however, it is likely companies will realize that climate change is also affecting their performance by disrupting their operations in the regions affected by environmental disasters. Such business incentives can be the most powerful ones in convincing companies to act, as it hits their bottom line. Another side of data availability is an increasing pressure on companies, from NGOs and customers, to share more details about their activities related to environment and act on that information.

While at the moment there is a certain pressure on companies from society, it still comes from smaller groups especially working on the issue. As data and services based on the data become available, the engagement of wider audiences is to be expected. NGOs and other interest groups would have more opportunities to investigate the impact of the business on the environment and to develop a new set of tools to analyze this data. While it may still be impossible to pinpoint the exact impact of

business activities in certain regions, it would be possible to check companies' claims to some extent.

Already by the beginning of the next decade we should see a new breed of companies devoted to transparency. These pioneers will operate on the principle of complete transparency, giving away large parts of their data on the regular basis in a standardized format. The goal of such companies is to showcase their business practices by inviting interested parties to scrutinize their data on the subject of climate change. These companies believe that the future trend would be towards openness of information on all levels (government, corporate and individual), thus making the move early on would bring them a first mover advantage later.

In the long term, transparency of companies is bound to become commonplace. The combination of external pressure, the opening of data by the government, economic viability, and general attitude change towards sharing information, would drive a revolution in transparency. Already today companies in highly industrialized areas, such as China, are looking for cleaner sources of energy and environmentally friendly manufacturing practices. Thus, by 2030, we expect to see a number of giant corporations being transformed drastically in order to keep up with new trends. Transparency would be a globally accepted trend. Global awareness of the importance of preserving Spaceship Earth for generations to come will lead to increased competition in certain domains, while also forming interesting partnerships. For instance, cooperation between largest data centre owners, such as Google, and energy utility companies, lead to discovering new ways to utilize the energy that before was wasted in data centres.

Another trend closely tied to mass-transparency is the ability to contextualize real-time data and make it relevant to the user. Ubiquitous computing, together with advancements in computing mechanisms (quantum and neuromorphic computing), would make processing and rapid delivery of relevant data a reality. Such developments, together with new-generation user interfaces would blur the lines between real and augmented virtual worlds.

Novel technologies can be used to easily relate current natural disasters to ongoing climate change. Consider, for example, a future journalist working on an article on lahar mudflows in Indonesia. Using suitable applications and software, the journalist can easily create an educative and visual description of why and how the heavy rains and consequent mudflows are now more common in certain areas and how it is related to the increased $CO_2$-level. Based on earlier disasters and economic models, the journalist can easily create estimates on how the disaster will affect Indonesia's economy in the future and estimate other consequences such as indirect victims due to decreased social conditions. All this can be created within two hours of the onset of a mudflow and added as an appendix to the article. The journalist can spend most of his effort on analytical work, which is then supported by these models. Information combined and delivered in this way has a potential to connect a complex and global issue, such as climate change, with concrete actions and consequences, driving the action among people.

## 4.2. The Future of Journalism

Personalized assistants will be the primary means of delivering journalistic content and other information to people. They can be software implementations or a full OS in a phone, smart watch or other wearables. Due to advancements in artificial intelligence (AI), such digital assistants provide well tailored content important to the user, giving individuals access to personally and contextually relevant information in real time, while even predicting certain events.

2014 marks the year where news of an earthquake in LA was first reported by an algorithm, only three minutes after it happened (Oremus, 2014). The tendency towards algorithm-assisted reporting will free reporters primarily from the more tedious side of their jobs, letting them concentrate their limited resources on more relevant part of their jobs. Liberating journalists from hunting breaking news and sensations would improve problems with media bias that is based in sensational live news and create space for investigative and explanatory journalism emphasizing problems that matter. This in turn has a potential to bring more of a spotlight on conflicts of interests among climate change proponents, businesses and political parties.

As algorithms improve, more and more of the news we consume on a daily basis will be compiled and delivered automatically, changing the journalistic ecosystem in the long term, as professionals will mainly concentrate on delivering social, economical, historical and political context for topics of public interest. This in-depth journalistic work is done mainly with hybrid media combining data, video, and even gaming. As the systems we deal with in our everyday lives become more complex and the world becomes more connected, it will require a diverse set of tools and the cooperation of scientists and journalists to untangle the connections. We see signals of this already today as data-oriented journalism becomes more relevant (FiveThirtyEight.com, theguardian.com/data); we can also observe a rise in explanatory media (vox.com), which is especially popular in new media channels (like 1veritasium's and CGPGrey's channels on Youtube).

High quality journalistic content will be of utmost importance, with more emphasis on research and putting data in social, cultural, political and economical contexts. This is especially important as new legislative and political decisions involve longer chains of reasoning, more data and more participation, information and communication technologies become more connected, creating wide spreading information networks in which a user is navigating, and supply chains of consumer goods become longer and harder to track. With climate change reporting, the $CO_2$ production is well-known from all parts of the supply chains, industrial processes, and different lifestyles. Even when the $CO_2$ production is not directly measured, it can be reliably determined by interested parties, such as NGOs, from various linked data sources.

## 4.3. Technologies Enabling Action on Spaceship Earth

The current trends in technology provide clear signals of what to expect in decades to come. In a context of media reporting complex issues, two technological trends stand out specifically: gathering of data and augmented/virtual reality (AR/VR).

Building a business based on the data collected from the users of Internet services has become a huge business. Companies like Google, Facebook and Twitter, thrive on providing user data to third parties (such as advertisers), which they collect by offering users free Internet-based services. Now there are some signals that suggest that data collection will cross boundaries of individual Internet services and cover other aspects of our life. Google recently acquired Nest (Google Inc., 2014), a company producing home thermostats and smoke detectors. Google is also interested in getting its services into cars, while innovative car manufacturers like Tesla collect all possible data about a vehicle, as well as driving patterns of its owner. IBM's vision of the smarter home envisions connecting all home devices into the network (IBM Corporation, 2010).

In terms of explaining complex problems, such data collection presents unprecedented possibilities, as it has the potential to reveal insights that were inconceivable before. In short term, many companies would develop their own data analysis tools for different types of big data. Additionally, there would also be some open source alternatives, available to consumers and smaller entities that could harness the power of the data and bring a change.

The other trend concerns the introduction of contextual technologies such as AR, which have a potential to revolutionize the delivery of media content to the user. From user perspective, these changes are bound to bring advancement in contextual technologies to make it easier for users to make decisions and faster to find relevant information based on the user's current context. In terms of media this means the delivery of more targeted information to the users and the use of context and contextual data as a tool to help people engage with the message.

New-generation user interfaces are particularly important when it comes to delivering contextual news. Technology offers the potential to have different contextual services that would combine the data and AR, from finding out about the ingredients and health characteristics of food products at the supermarket to the applications about carbon footprint and energy efficiency in our daily actions. A combination of unprecedented data-gathering tools and story-enhancing technologies such as AR has the potential to open society's eyes to a shifting baseline and the impact of one's actions on the environment.

In the short term, society starts changing even though the changes are slow *at this point*. Very much like companies, the majority of the population has yet to pass the stage of awareness and switch to action. Availability of data, tools for analyzing the data, skills of reporters and climate change watchers to analyze the data, and quality of media reporting would be expected to improve in the next five years.

In the long term, for Spaceship Earth and explaining climate change, technological change would bring new forms of reward for green behaviour, through new types of green NGOs and specialized organizations. A membership of such an organization would be considered an honour to those special individuals who have contributed the most to increasing awareness, influencing other people's environmental habits or opening up the truth about some high-carbon footprint companies. Many investigative data journalists would be among the members of these organizations.

In the upcoming technology-savvy generation, kids from early school days learn about the concept of Spaceship Earth and how to be environmentally friendly. Availability of the data and tools to analyze it would ensure that discussion is based on facts and scientific arguments, rather than on speculations, prejudices or emotions. Because of the described improvements and novel means of reporting on their habitual actions, people, in general, will be much more environmentally aware and responsible. It is a new norm of behaviour for people to be open about their own environmental-footprint, and most of the social networks now add such a field on personal profiles. It is also considered to be a negative sign if someone is hiding such information from their profiles. Sophisticated means are established to calculate such an attribute from different data sources for an individual.

## 4.4. The Fifth Context: Environmental Impact

The next step is to look at how all the aforementioned tools and technologies could be combined to create a heightened awareness for the environment in the general public. The combination of open data from government and pioneer companies, as well as scattered data from other corporate players, NGOs, scientists and media to investigate the impact of human activities on the climate in greater detail than ever. This sets a foundation for the new ways of reporting complex problems.

In addition to businesses, there is a worldwide Wikipedia-type project called 'Datapedia' going on that is aiming to collect all the openly available data in one location and offering a platform that users can build links between the data.

By 2030 climate science and modelling has advanced to the stage where the reliable forecasts of the weather trends can be created up to one year. There are commercial companies offering such forecasts. Warnings about floods and hurricanes can be given up to half a year in advance. As well, there are plenty of popular-science applications and games about the climate data.

At the same time, an active minority concerned with sustainability and climate change is gaining momentum. While this is largely limited to the more privileged layers of society, consisting of higher-income, highly educated young professionals, for them climate change consciousness is mainstream. Availability of data and tools has strengthened crowdsourcing movements, digging through the data and connecting activities and events related to the climate change. Such activism creates the base for new sources of information and new services for people to track climate change and put pressure on companies, governments and fellow members of society to take action.

Games and culture are a great way to distribute information in a casual and engaging way. Ingress (http://www.ingress.com/) is a popular AR game today that actively creates awareness of monuments that are converted into portals in the game-layer and require the player to regularly visit monuments in their surroundings in order to participate in the game. Similarly AR games that involve the environmental context can help users to understand effortlessly and engage with such complex themes as the carbon cycle, heat deflection, water distribution, light pollution and its impact on the flora and fauna surrounding us in our everyday lives, and how it has changed over the last century due to human activity.

Another application of the aforementioned technologies is called 'Atmosphere game'. It is a popular way to educate people about the mechanisms of climate change. Advanced climate sciences and increased computation power have enabled atmosphere models that can be used to create educative games. In the Atmosphere game, the user can simulate climate predictions by changing the parameters of human activities: oil price, environmental taxes, national GDP growth goals etc., and then observe the consequences in the form of average temperature, pictures of changed local climates, and local economical parameters such as food prices.

Interactive media is needed to create educative journalistic work of these more complex phenomena. The reader needs to have the possibility to put these mechanisms into action. For example, in political reporting the reporting can be enhanced by the economics game, in which the reader can change something and see the predicted consequences of his or her decisions. There has been an increase in availability of these simulations and prediction tools in the last ten years, and they are becoming more essential way of how Western citizens perceive the world. Reality and virtuality are colliding and becoming one self-fulfilling prophecy. This has increased and continues to increase the weight that science has in public debate, yet misinformation is still common within these games, which can become dangerous and misleading.

Our best chance to counter misinformation is widespread user participation, crowdsourcing and accessibility due to user friendly tools, and the trend of media production turning into a common knowledge that everyone has access to. We recommend investing heavily in freedom of speech, net neutrality, raw open data and other movements that enforce the free flow of information and actively enable user participation.

## 5. *Discussion*

Having presented a viable and preferred future, in this section we take a look at our assumptions and alternative possible scenarios. After that, we summarize the main conclusions about the future for each of the issues identified in the present-day reporting.

First, let us recall the trends that we identified as relevant for the discussion on future of media: data journalism, contextual computing, next-generation user inter-

faces and information visualization. All of these trends are currently evident, some of them in root phase, for example, contextual computing, and others having already reached a developed phase, such as data journalism. However, we consider that all these trends have great potential to grow and transform from their current form, and, importantly, they are interdependent. Namely, contextual technologies build on top of available (open) data and high-quality visualization. At the same time, next-generation user interfaces are imagined to provide a novel platform that will likely transform contextual technologies as we currently see them on top of mobile devices. Information visualization is as old as the tradition of data collection amongst humans. Nevertheless, such a large amount of (Big) Data is available today that the visualization techniques need to catch up. Analysis of the current business and entrepreneurship scene and research literature suggest that those are the trends with the largest potential to change the media as we know it. Having taken a short look back at how the Internet itself has disrupted the printed news media, we conclude that the global media disruption is still taking place, along with the development of the trends that we identified.

As for the alternative future scenarios, it is obvious that there are many factors at place, some of them more likely and some of them less. As Curran (2010) has shown, a large portion of predictions in research literature have proven to be wrong. He also discusses the moral point that one needs to take to try to actively influence the future of media by discussing a desirable and possible future. This is the approach we adopt in this article, in particular since the stakes with regards to climate change are so high that we believe everyone on the planet needs to take the best action they can starting now. Considering how crucial a role media plays in general human actions, in this article we suggest an actionable future for it. We think that our described scenarios belong to the area of a future that is most probable. To justify this, we use the scientific predictions regarding climate change, those same predictions that, due to the current media situation, a large part of the population is not aware of, let alone those who do not believe that the climate change is happening at the first place.

According to some of the most recent scientific articles and agency reports (Hegerl, Hoegh-Guldberg, Casassa, Hoerling, Kovats, Parmesan, et al., 2010; Knox, Hess, Daccache, and Ortola, 2011; Oreskes, 2007; Stocker and Qin, 2013), we can expect some strong-to-catastrophic consequences of climate change in the near future. The report conclusions by the Intergovernmental Panel on Climate Change (IPCC, 2013) are unequivocal on global warming in the atmosphere, ocean and the Earth's surface and cryosphere. The analysis attributes these changes to humans. Unless human activities with regard to carbon and greenhouse emissions drastically change now, we expect to witness many more such events in the near future. Thus, our predictions on different approaches in future media reporting on climate change and complex processes in general will be reinforced by such events. At the same time, as we describe above, the technology will offer a possibility for transformation, which media needs, or will be forced to accept.

To summarize, we identify following answers to the current issues in reporting:

1. **Shifting baselines:** In the future Big Data will provide enough historical data for the slow processes to be actually easily observed on different levels. Geotagging of images and other content will enable people to see how locations and places have evolved. When time passes, we will get more data about the slow trends, such as fish getting smaller.
2. **Feedback loop is slow:** Human behavioural data is accumulating at a rapid pace. Social media can be considered a huge sociological experiment producing such data. In the age of context, this data becomes essential when delivering information about slow processes. To tackle this issue, prediction mechanisms based on such data and context will be used. It is easy to imagine applications that warn a user about what will happen if he continues with the current trend of his action. Because of the increase in contextual technologies, the virtual world will be an essential part of people's everyday lives. Smart phones will guide behaviour by bringing more relevant facts to their attention.
3. **Cumulative actions matter:** As a consequence of the data collected everywhere (sensors, smart meters, $CO_2$, social discussions...), and contextual computing, reporting individual influences and cumulative nearby community (neighborhood) influences will be easy. To distinguish the drops in the ocean, people need to be instantly reminded and shown the consequences of their actions. Interactive and engaging applications, such as games combined with environmental data will help reach this goal. We see a future where the energy distribution systems are completely redesigned, and everything produces data. Inhabitants of future smart cities will share their environmental impact data over social networks where everyone has a personal environmental influence index.
4. **Conflict of interests:** In the future, we expect companies to be working towards being carbon-free. Sophisticated systems that track and measure environmental indicators will be developed. The media pressure will, thus, be high, and companies contributing to climate change will be subject of public criticism.
5. **Media bias:** Future technologies, such as Augmented Reality and next-generation user interfaces, combined with large amounts of data and contextual technologies, will make reporters great storytellers. Thus they will be much more adept at spreading messages about complex processes that were difficult to present before or avoided.

To conclude, we think that a combination of the trends we presented will enable reporting complex processes in the future. In particular for climate change, media and reporting will introduce currently missing information flow, which we name as the environmental context, presented by the blue line in Figure 1.

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# SMARTWEAR: Future Smart Wearables to Improve Our Health and Media Communications

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**Abstract.** Whilst this paper presents a state-of-the-art report of the fast-emerging wearable technology industry, it narrows its focus to the future of smart wearables as a mass media communication platform and to the contribution smart wearables will make to the health and wellbeing sector. As such, we make three predictions: First, that wearables and smartphones will merge into what we call 'smartwear'. Second, smartwear offers new forms of mass media communications. Third, when used as a mass media communication platform, smartwear will completely transform our lives, especially our health and wellbeing. Smartwear will allow users to download a mul-

titude of apps that can connect to sensors on the body to monitor relevant aspects of our daily lives, such as vital health signs, current location, and geographic movements. These smart wearables can share our data in real time 24/7 amongst our communities or 'tribes' and with health and wellbeing service providers. We propose in this paper that over the next decade smartwear will deeply impact the way in which health and wellbeing services will be developed, delivered and monetized by organizations, governments and corporations. In discussing the challenges and opportunities smartwear will offer us, this paper presents possible implications on a society and an individual level, such as privacy and data security.

**Keywords:** Business model, end-user, health and wellbeing, lifecycle thinking, platform, privacy, smartwear, wearable smartphones, wearable technology

# 1. Introduction

There is an expectation around the world that wearable technology is set to pervade our everyday lives over the next decade. For many, whether individuals looking to improve their lives or corporations seeking to capitalize on a growing market, wearable technology appears to offer an exciting future.

Speaking at a Wearable Technologies Conference in San Francisco in 2013, Harry Strasser, Managing Partner at Wearable Technologies Group, claimed that after a decade of interoperability and standardization issues: "We envision a connected world, where everything in people's lives will have computing power, wireless connectivity and many unobtrusive sensors. Wearable technologies will substantially enhance people's lifestyles and work styles" (*Business Wire, 2014*).

The head of innovation for Carat, the world's leading media planning and buying agency, Matthew Knight, agrees that wearables will increasingly contribute to our daily lives: "Wearable tech suggests a future where interfaces are less intrusive, more passive, more ambient, more subtle a future where devices are aware of what we are experiencing, feeling and doing without explicitly asking us for that information. The larger ecosystem of contextual sensors, ambient interfaces and the internet of things will start to create an immersive world that we live inside, rather than just swipe and peer into through our phones and tablets" (*Cornish, 2014).*

## 1.1. The Age of Context

The 2013 book *The Age of Context,* by Robert Scoble and Shel Israel, suggests that wearable technology fits perfectly into the latest evolution in technology contextual technology which 'understands' intimate aspects of our lives and our environment. The authors describe five current forces shaping what they call 'the age of context' in society, all of which are key features of wearables: mobile devices, social media, data,

sensors and location-based services. For Scoble and Israel, wearable technology is emerging as a major technological force to improve our lives and make us healthier, partly by allowing us to be more informed and aware of our own personal health as well as the wider societal health issues surrounding us, and partly by allowing us to share and communicate our health data with others.

## 1.2. The Age of the Platform

Another timely phenomenon that the wearables industry can take advantage of is what author Phil Simon describes as a revolutionary new way of doing business called the 'platform'. In his 2011 book *The Age of the Platform: How Amazon, Apple, Facebook, and Google Have Redefined Business,* Simon outlines how the 'gang of four' Amazon, Apple, Facebook and Google created an entire ecosystem of partners, developers, users, customers and communities, all dependent on each other as a collective unit. He believes that what makes these platforms so successful is that they focus primarily on consumer (user) usefulness and communications, both of which are the reasons why wearables hold so much promise as a future 'device' that will capture the mainstream imagination. Whilst this ecosystem has paved the way for a wearables revolution, new ecosystems still need to emerge some from scratch, others through evolution to service this wearables revolution.

## 1.3. Wearables and Smartphones to Merge into 'Smartwear'

We propose in this paper that this revolution will see the capabilities of smartphones merge into wearables, rendering smartphones inconsequential. As wearables adopt more of the functionality of current smartphones, especially the ability for users to download a multitude of apps into their wearables, they will become what we call 'smartwear'. We note at this point that in early 2014 Sony introduced the term 'SmartWear Experience' as a brand name to describe the cohesion between its new SmartBand device and its new Lifelog application. Ironically, we also note that a company called General Hearing Instruments Inc markets a hearing aid called 'SmartWear'. To our knowledge, however, in reference to the merging of smartphone capabilities and wearables, the term 'smartwear' is a new one.

After almost twenty years of genuine take off for mobile phones (GSM, CDMA, 3G), the smartphones were the next disruptive technology enhancements with their colourful and large displays. Whilst the smartphone has entered the market on a huge, revolutionary scale, for some its future is uncertain as wearables gain traction amongst users. However, with wearables today still offering more hype than widespread practical use, this may be difficult to believe in 2014. Nevertheless, the great promise of wearable devices is that they have the potential to offer us a more sophisticated, instinctive, hands-free way to interact with mobile technology. Smartphones of the future will not be in our pockets or hands because this will increasingly become

an inconvenience in the workplace, at home and at play. Instead, this paper predicts that smartphones will be worn on our body in the form of 'wearable smartphones' or what we call 'smartwear' taking the form of glasswear or smartwatches or integrated into our clothing. Hugging our body, they will be more intuitive and sensory, allowing us to feel incoming notifications and tracking our vital health signs as we work.

In this way, we also argue that smartwear will offer us new forms of mass media communications. We will be able to read and watch news content and share it with friends, via our smartwear, while catching the train to work. Through our involvement with the Quantified Self (QS) movement, we will automatically and constantly share personal data with masses of other smartwear users, enabling future news media companies to analyze and interpret this 'big data' in order to produce and publish news content. For example, if enough wearable users indicate an abnormal rise in body temperatures in one geographic location, such as a city suburb, news media with access to this collective data may be able to report this anomaly along with possible causes and repercussions.

## 1.4. Smartwear in the Health and Wellbeing Sector

Our third prediction in this paper is that smartwear taking on the functionality of smartphones offers the promise of completely transforming our lives, especially our health and wellbeing. Even today, the smartphone is a sophisticated self-tracking device that can record and track every facet of our lives. With it we can download the latest exercise and diet apps, to the point that many people are using their smartphones to quantify their health data. With it we can share our health-related data with others via social media platforms, search online for the closest health service providers, and book medical appointments. Smartphone apps built into wearables allow patients to record their own heartbeats and forward the audio to doctors who can track the development of their health conditions. As our smartwear tracks our sleep patterns, stress levels, blood pressure and other metrics, customized food and exercise plans, as well as real-time advice, can be delivered to us via apps in our smartwear. Our smartwear then enables us to share this information with doctors in an attempt to help us lose weight.

We argue in this paper that combining the capabilities of both smartphones and wearables will add an extra dimension of usefulness for users, especially in the workplace. For instance, Google Glass already is being tested by surgeons to treat patients. With it they can quickly look at a patient's online health information on the device's screen in order to apply the correct medication without having to put down their scalpel. Glass' high-resolution camera can capture and transmit live video footage of an operation to other surgeons in other locations in order to collaborate and improve the success of the operation, perhaps even saving the patient's life. Because it responds to voice commands and head movements, this wearable smartphone allows surgeons to focus on the patient while searching and communicating with other medical staff

all without having to use their hands to operate a computer, TV monitor, camera, phone or medical textbook.

Transitioning from just 'wearables' to 'smartwear' means that third parties in this evolving ecosystem will be able to develop apps for wearables. It is possible that new winners in this new operating system environment are yet to be born. In this way, wearables, like smartphones, tablets and PCs, will join the present ecosystem of partners, developers, users, customers and communities developed by the 'gang of four': Amazon, Apple, Facebook and Google. As smartwear manufacturers open up their devices to innovative external developers, users of smartwear will have thousands of apps to choose from to help them improve their health and wellbeing.

In the following sections of this paper, we present a state-of-the-art report of the opportunities and challenges in both the emerging wearables industry and the current health and wellbeing sector. This then leads us to a discussion around the integration of smartphone capabilities into a single, seamless, intuitive device called 'smartwear' that will potentially enhance our health and wellbeing. Using McLuhan's 'tetrad of media effects' model to frame our concluding discussion, we offer a prediction of the radical changes over the next decade that smartwear will bring about in society, and particularly in the health and wellbeing sector.

## 2. *The Wearables Industry*

### 3.1. What Are Wearables?

Perhaps because it is still an emerging industry, definitions of wearables are scarce and vary amongst the players in the industry. The term 'wearables' has been used alongside terms such as 'wearable technology', 'wearable computing', 'wearable devices', 'wearable gadgets', 'fashion electronics' and 'e-textiles' (e.g., 'smart garments'). It includes electronic technologies or computers incorporated into items of clothing and accessories worn in or on the body. More invasive versions include implanted devices such as microchips and smart tattoos. Wearables perform the same computing tasks as mobile phones and laptop computers, but they tend to be more sophisticated by providing sensory and scanning features not typically seen in mobile devices, such as biofeedback and physiological function tracking. Designs often incorporate practical functions and features, but may also have a purely critical or aesthetic agenda. Examples include watches, glasses, heads-up displays (HUD), health and fitness trackers, health monitors, scanners, navigation devices, and clothing.

There are some common features amongst wearables. For instance, they are often worn on the body, and in some cases they can be incorporated into the body. They offer some form of communications (direct or indirect) and automated data-input and/or data-output capability. The wearer has access to information in real time, all the time and at any time. Wearables also often include tracking, sensory and scanning

capabilities, as well as the ability to store data locally. Finally, wearables are able to be synced with mobile devices and other smart devices, such as in a home or office environment.

This paper attempts to consolidate key aspects of various other definitions of wearables in order to offer our own definition in the hope that it captures the essence of the valuable contribution wearables can make to individuals' lives:

> *Wearables enable communication of valuable content in real time (24/7) between individuals, between individuals and organizations, and between individuals and applications through smart devices worn on or in the body in order to track, sense, sync and/or scan data or information valuable to the wearer.*

## 3.2. The Wearables Market

Technology analysts estimate that wearable technology is already a 3 billion to 5 billion USD market today. For instance, the professional services firm Deloitte predicts wearables could be worth 3 billion USD in revenue in 2014 (Deloitte, 2014). Gartner, the technology research and advisory firm, predicts global revenues from various wearable devices, apps and services in the fitness and personal health category alone could be 1.6 billion USD in 2014, and that this could increase to 5 billion USD by 2016 (Gartner, 2013). Over the next two to three years, industry analysts predict revenues in the wearables industry could jump to 30–50 billion USD (The Business of Fashion, 2013), although some are more conservative, claiming 74 billion USD will be reached by 2024 from today's 14 billion USD (Harrop, Raghu, and Guillaume, 2014).

Estimates of the overall number of wearable devices being sold in 2013/2014 range between 10 and 22 million. Deloitte predicts that 10 million wearable devices could be sold in 2014 alone. Of those 10 million units, 4 million are expected to be glasses, 4 million will be fitness bands, and the remaining 2 million units will be smartwatches. By 2020, Deloitte believes more than 100 million users will be using smart glasses (Deloitte, 2014).

Cisco, however, believes that not only is the number of wearable devices sold in 2013 around 22 million, but it predicts that the number of wearable devices will skyrocket to 177 million by 2018 (Cisco, 2014). Gartner forecasts that by 2017 more than 50 percent from the mobile app interactions will be caused by wearable devices with more than 100 applications in use per person per day (Gartner, 2014). That would mean millions more smartwatches, glasses, jewellery, and wrist gadgets entering into our work and personal lives.

**Table 1.** ***Potential estimated market in USD (various sources)***

| Sources: | Definition of wearables | Time frame | Market value | Now | Future |
|---|---|---|---|---|---|
| Business insider | Wristworn devices (60% fitness&medical) | 2014-2017 | USD billion | 5 | 11 |
| Deloitte | Wrists, watch, glasses | 2014 | USD billion | 3 | |
| Gartner | Wearable devices, apps and services for fitness and personal health | 2014-2016 | USD billion | 1,6 | 5 |
| IDTECh EX | Wearables market | 2013-2024 | USD billion | 14 | 24 |
| IHS | Performance monitoring, MEMS | 2013 | USD | 2,3 | |

## 3.3. Technologies

The wearable unit consists of a wide variety of components: sensors, wearable materials, smart textiles, actuators, power supplies, wearable communication modules and links, control and processing units, user interface for the user, software and advanced algorithms for accumulated sensing information and decision making. Form, function and user experience are the keywords that have guided designers in the electronics industry over the years, and similar design principles are being followed in the field of wearables (Lindholm, 2014). In the case of wearables it is mostly about the materials that customers are willing to wear for long periods of time. Designers must consider the textiles into which electronics are attached, glued or embroidered. In this section we look briefly at the two types of materials related to wearables, namely textiles and electronics.

**Smart Textiles.** Smart textiles, also referred to as electronic textiles, smart clothing or e-textiles, are those fabrics that are embedded with digital components. Smart textiles focus on the seamless integration of textiles with electronics components, such as microcontrollers, sensors, actuators. A mass producible, flexible, foldable, stretchable, washable and low-cost wearable textile fabric is usually desired.

Smart textiles use electronic components to provide, for instance, health monitoring, thermal regulation and ambience intelligence. Innovators in the textile industry seem to consider options to merge textiles and electronics either through adoption, integration or a combination of both. *Adoption* means that textiles can be utilized as a basis to either carry or embed electronics. *Integration* goes a step further and connects the materials through embroidering them together. The combination of both is about using the inherent functionalities of the new materials such as fiber-based circuits or photovoltaic fibers (Köhler, 2013). These three mixing combinations seem to be well-aligned with innovation theory moving from initial incremental stages to the substantial innovation, and finally into a radical one (see Rogers, 2003).

New fabric sensors and trackers are created to exploit the electrical properties of soft materials and advanced knitting techniques that can be seamlessly integrated in clothes to make them ‘smart’ or ‘intelligent’. Smart fabric switches and circuits using

conductive yarn are currently of particular interest in the textile trade. Fibers infused with fragrant oils or vitamins offer anti-stress, calm-inducing properties. E-textiles can also electronically monitor the user's health or state of mind through interactive wearable computers integrated into body-hugging material.

**Sensors.** Sensors are one of the essential components of wearable computing. The basic idea of a sensor is to monitor a person's activity and/or health condition and act as a medium to transfer sensing information to a device with high computing power. Several sensors can be used in wearable devices, such as light, temperature, accelerometers for movement, pressure sensor, and infrared sensor for motion detection. Biometric sensors with wearable computers allow interactions between the wearable device and the wearer in biometric monitoring for personal health. These biosensors are capable of measuring significant physiological parameters like heart rate, blood pressure, body and skin temperature, oxygen saturation, respiration rate and electrocardiogram. How these measurements are communicated to external devices or central units for further processing will be discussed in the next section.

**Wearable Communication.** Communication between wearable devices is performed through a wireless medium. Wearable devices are attached in proximity or contact of the human body, such as a watch phone, a wearable computing device, and healthcare or monitoring devices and form a wireless body area network (WBAN), as shown in Figure 1. Previously, the communication was served by low power consumption services such as WLAN or RFID. However, wearable devices are now offering communication services in a large scale, such as Wideband Code Division Multiple Access (WCDMA) worn on the body.

However, wearable communication can take place within the sphere of WBAN and a Personal Area Network (PAN). The content produced or consumed by wearable devices required the following communication requirements:

1. Communication from outside a user's body to wearable devices
2. Communications within the body area (WBAN)
3. Communications from WBAN to PAN

Fig. 1 shows the components of a Wireless Body Area Network (WBAN) and a possible communication platform.

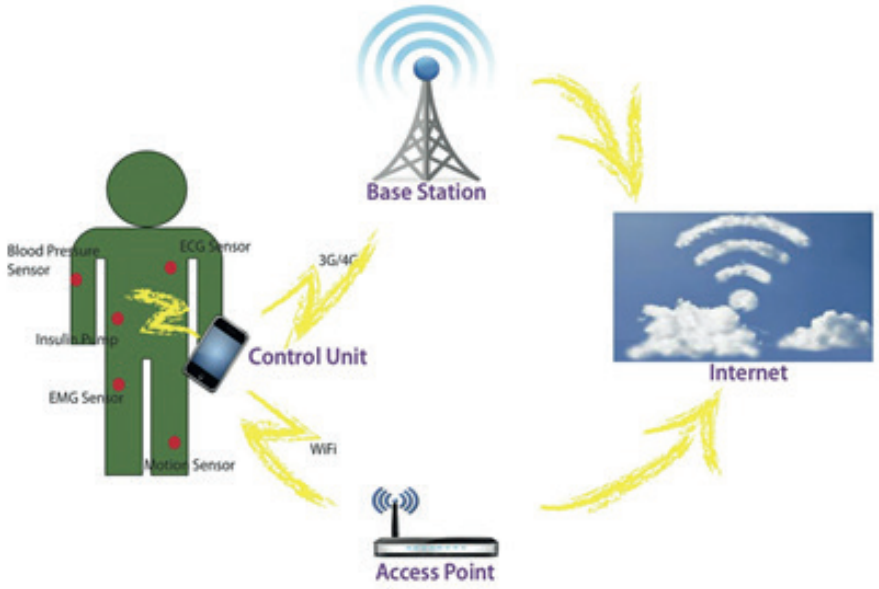


**Fig. 1.** ***Wearable communication***

WBAN consists of smart devices attached to or implanted in the body that are capable of establishing a wireless communication link. Smart devices can be of two types: sensors and actuators. The sensors are used to measure certain parameters of the human body, either externally or internally (e.g., measuring the heartbeat and body temperature). The actuators are used to take some specific actions based on received data from the sensors or through interaction with the user. Interaction with the user or other persons is performed through a personal device (e.g., PDA and smartphone) which acts as a sink for data of wireless devices. The communication between these devices can use the techniques from Wireless Sensor Networks and Ad-hoc networks. Types of devices and their related functionalities that are required include:

1. Sensors: This node responds to and gathers data on physical stimuli, processes the data if necessary and reports this information via wireless link. It consists of several components: sensor hardware, a power unit, a processor, memory and a transmitter or transceiver.
2. Actuators: This device acts on received data from the sensors or through interaction with the user. The components of an actuator are similar to the sensor's: actuator hardware, a power unit, a processor, memory and a receiver or transceiver.
3. Wireless Personal Device: This device accumulates data from the sensors and actuators, and informs the user. The components are a power unit, a processor, memory and a transceiver. This device is also called a Body Control Unit (BCU), body gateway or a sink.

**Power Sources:** Wearable communication requires not only wireless networking of nodes but also wireless powering. The power requirements of wearable devices can be compared to high performance notebooks. Energy can be saved by reducing display sizes in wearable devices. Another way to reduce energy consumption partly is by offloading computation to a connected wireless host computer or to cloud services. Presently, batteries are the main solution for powering most wireless devices, but unless they can provide significant lifetime, battery replacement may be a significant deterrent to ubiquitous adoption of wearable technologies.

The variety of energy sources can be leveraged in the node's environment, such as motion and vibration, airflow, ambient electromagnetic fields, light and infrared radiation. In the latter case, solar cells can be an effective solution. Though the trade-off lies in placement of sensor in a well-lit location, correct orientation and free from obstructions, scavenging power from vibration or body motion is a future possibility.

## 2.3. The End-user the Wearer

Nielsen's recent Connected Life Report found that young adults lead the charge in adopting wearable tech, with consumers between ages eighteen and thirty-four making up half of owners of fitness bands (49 percent) (Nielsen, 2014). Cisco believes that by 2018 there will be 1.4 wearable devices per person, indicating a staggering 7.6 billion M2M modules (Cisco, 2014).

U.S.-based open cloud company, Rackspace, recently reported that in 2013 18 percent of the population in the U.S. and UK were using wearable technology, and the majority of those users say the devices are making their lives better (ACM Technews, 2013).

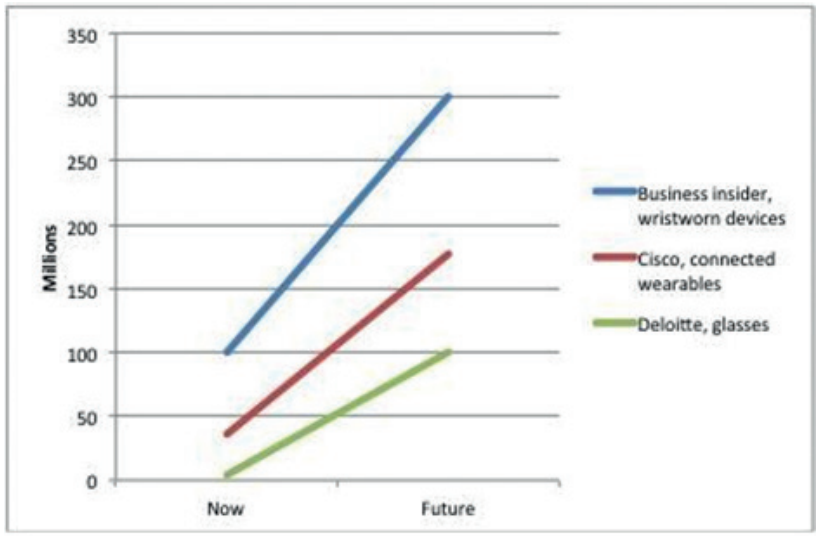


***Fig. 2. Estimated number of wearables (various sources)***

Whilst the revolution in wearables is being driven by advancements in communication technology, human-centred thinking is also influencing design and engineering. It is widely acknowledged that to ensure business success it is important to consider the end-user in the beginning of the innovation process (Witt, 2008). The following six human factors suggested by Buenaflor and Kim (2013) can be indicative of how to evaluate and estimate the future success of a product: (1) fundamental needs, (2) cognitive activity, (3) physical aspect, (4) social aspect, (5) demographic characteristic and technical experience, and (6) aesthetics and fashion. These six key elements are believed to assist researchers, device designers, and developers evaluate the acceptability and usability of their devices. For instance, Christian Lindholm, CEO at Koru Lab, Helsinki, claims that aesthetics plays a crucial role in the take-up of wearables (Lindholm, 2014).

History has shown how technological innovations have reshaped civilizations. In the same way, the adaptation of wearable smartphones will change the way we live and work. With the fast development of wearable technology, many foresee a future society enveloped by high tech. In the near future we will live in an immersive information experience rather than simply looking at various screens around us. According to Cornish, "Devices and technology will be increasingly less 'visible', but their capabilities and value will be richer and deeper" (Cornish, 2014).

# 3. *The Health and Wellbeing Sector*

## 3.1. Markets

The industrialized world is facing a chronic disease epidemic. There are an estimated 1.5 billion chronic pain sufferers around the world (Farmanfarmaian, 2014). Diabetes, cardiovascular disease and cancer are among the group of chronic diseases that accounts for most deaths in almost all regions of the world (Cohn, 2013). In the U.S. alone 35 percent of adults are obese (American Heart Association, 2014). Chronic illness is becoming increasingly expensive to manage. Diabetes alone drives about 10 percent of U.S. healthcare expenditure (Farmanfarmaian, 2014). Britain and the U.S. are facing a shortfall of doctors as the recruitment to medical schools fails to keep pace with an ageing population and the growing numbers of people living with long-term health conditions needing care (Honigsbaum, 2014).

Healthcare and wellbeing are sectors in which demand for services is increasing more rapidly than the supply of care services. And the costs are rising. Both developed and developing countries face these challenges, and one question many governments are asking is whether healthcare should be delivered via private or public funding. The focus of many government health authorities is shifting from disease management to disease prevention in an attempt to keep citizens out of hospitals.

One solution may be the utilization of technology to increase the productivity of healthcare and wellbeing service providers and to engage the public to take responsibility for their own health and wellbeing, especially when managing their chronic illnesses. For example, it seems two of the biggest players in the smartphone market are positioning themselves to offer devices and apps that could shake up the health and wellbeing sector. It was rumoured by technology analysts that Apple might unveil a new fitness-focused app, called Healthbook, at its World Wide Developer's Conference in late May 2014. Actually Apple revealed a health application dubbed Healthkit., which has APIs to monitor activity, body metrics, weight, location and other measures. Samsung also has been showing serious interest in health and fitness with its most recently announced products. The Galaxy S5 includes a built-in heart rate monitor and pedometer which sync with the Samsung's S Health app. In early 2014 the company also announced its Gear Fit wristband designed to keep track of our workout by showing us how far we've run, our heart rate and how long we've been exercising.

## 3.2. Trends

One key trend within the health and wellbeing sector is mobile health (mHealth). Healthcare Information and Management Systems Society (HIMSS), a U.S.-based global non-profit and multi-stakeholder organization promoting the use of IT within healthcare recently published its mHIMSS Roadmap to provide guidance to professionals, organizations, corporations and health systems on the adoption of mobile and mHealth devices. The Roadmap is divided into six sections:

1. New care models,
2. Technology
3. Reimbursement,,payment models and ROI
4. Legal and policy
5. Standards and interoperability
6. Privacy and security

In the future, mobile technology may hold the key to improving access to specialized medical services, more effective preventive care, better monitoring of chronic conditions, and improved patient outcomes. Through the development of interactive mobile applications (apps) for smartphones, tablets, and laptops, healthcare providers can deliver personalized services to patients and families at home, at work, at play, or when travelling. In this way, the rapid development of mobile apps will allow for a dramatic expansion of telemedicine and telehealth services.

Babylon is an example of a smartphone app that appears set to revolutionize mobile healthcare services in the UK. It is designed to make booking healthcare appointments as simple as possible and gives patients access to doctors twelve hours a day, six days a week for £7.99 per month. Using an iPhone or Android app, patients are able

to send a simple text query or a photo to a medical practitioner. They can also book a secure video or face-to-face consultation. Following the consultation, the patient can have a prescription sent to a smartphone, to the home by mail or to a nearby pharmacy. Patients will then be able to rate their experience anonymously. A function called Monitor is being developed which allows patients to keep track of their vital health signs, such as daily activity, calories and sleep, as well as looking at the relevant metrics related to bones, hormones, and kidney and liver function (Solon, 2014).

A doctor monitoring these signs may notice signs of stress in the patient, such as through higher blood pressure or cholesterol levels, allowing the doctor to clinically intervene to deal with the problem. In essence, Babylon is contributing to the move from a reactive healthcare model to a proactive one.

# *4. Wearable Smartphones in the Health and Wellbeing Sector*

## 4.1. Merging Wearables and Smartphones

This paper predicts that smartphones will eventually disappear. In fact, we are entering a more mature stage of smartphone adoption across the globe. A 2014 report from BI Intelligence predicts that in the five years from 2013 to 2018, smartphone shipments will achieve average annual growth of 20 percent, down from 42 percent for the period 2007–2012. Smartphone shipments are predicted to grow 35 percent in 2014, reaching approximately 1.3 billion units. Annual shipments should reach 1.7–2 billion units in 2017/2018 (HIS Whitepaper, 2013; eMarketer, 2014).

Rapid innovation is what initially propelled smartphones into the mainstream. To create the device, manufacturers took two ubiquitous consumer electronic gadgets – the PC and the cellphone – and combined their best functionalities to create an unprecedented mobile Internet experience. Since then, smartphone hardware innovation has focused on faster processors, better cameras, larger screens, more durability, and a lighter, thinner form. Today, smartphone innovation is slowing down. Most flagship smartphones that debuted in 2013 did not introduce brand-new features, instead opting to simply improve on the previous generation's iteration.

At the same time, users are increasing their use of smartphones for health and wellbeing purposes. The fast-developing market for smartphone health apps and digital medical devices is predicted to be worth 26 billion USD by 2017 in the U.S. alone (Jahns, 2013).

The ownership rate of fitness bands and mobile health devices is growing at approximately the same rate as the usage of fitness and health apps on smartphones. Nielsen's 2014 Connected Life Report found that nearly one-third of the 46 million U.S. smartphone owners accessed apps in the fitness and health category in January 2014. This was an 18 percent increase in users compared with the same month in

2013. Popular apps that connect consumers with their wearables include FitBit (with 3.3 million users), Nike+Running (0.8 million users) and Samsung's S Health app, which attracted more than 3 million users in January (Nielsen, 2014).

As the technology and functionality of wearables rapidly evolves, there are predictions that wearables and smartphones will merge (Lund, 2014). When Apple introduced the iPhone, the big change was that it opened the door to third parties to develop apps for the phone. That converted the phone into a smartphone. The innovations were opened to a large group of companies, not just the manufacturer of the phone. Google followed with Android, and then Microsoft followed. Today we have zillions of apps to choose from and run on our smartphones. Everyone with a smartphone can personalize it by choosing any app they want.

Is the same process happening in the wearables industry? Are they becoming smart and running apps developed by multiple innovative companies? Suunto is one local example of a manufacturer of smartwatches that can download and run apps from an app store called My Suunto/Movescount.

Could that happen within the healthcare and wellbeing sector on a large scale? Will there be smart wearables that can run apps developed by multiple innovative companies, collecting data from sensors and other devices attached to wearables monitoring our health and wellbeing locally and communicating the data with doctors and healthcare service providers when needed? Smart wearables could even predict our wellbeing and give instructions to medication devices we wear, perhaps as a 'smart guardian'. There is currently a wearable monitoring app that can control a diabetes insulin pump to prevent hypoglycemia.

We predict that the smartphone as a separate device with a display and keyboard will transform into an integrated set of smart wearable devices. There are a number of benefits to this. Smartwear can communicate with other people as they are in front of us, with no need to hold a smartphone and look at it or keep it close to the ear. Therefore, we predict the following features of smartwear in the near future:

- Smartwear will always be with us, night and day, 24/7.
- Smartwear will have a renewable energy source. They will be powered with our movements or body heat or some other new energy source which makes them independent of outside energy sources. There will be no need to recharge, no need for clumsy cables, no need to find a power outlet, and no need to buy new batteries.
- Smartwear will always be connected to a mobile network, which can be Wi-Fi, 3G, 4G or some future network. The connection will be made or transferred transparently without manual involvement.
- Smartwear will also communicate directly with other smartwear users close by with no need for operator intervention.
- Smartwear will act as our communication hub for all sensors, monitors and devices we wear and use.

- Smartwear will display messages, pictures, videos and other visuals using transparent glasses, contact lenses or similar technology (e.g., Google Glass and Nokia Glass).
- Smartwear will always be connected to our ear using earphones so that we can listen at all times to whatever comes in, e.g., Google Glass earphones.
- Smartwear will inform us of incoming calls or messages, and we can accept them with ease (e.g., Sony Watch).
- Smartwear will have speech recognition capabilities so that we can enter text or give commands using our natural spoken language and have our hands free (Einstein, 2014).
- Smartwear will be able to send video and audio from what we see and hear.
- Smartwear will have sensors to monitor our vital health signs like temperature, heartbeat, blood pressure and blood sugar.
- Smartwear will be able to track and communicate our exact geographic location.
- Smartwear will have sensors to our emotions and feelings.
- Smartwear will be connected to our identity.

We will be able to buy and download apps into our smartwear to personalize their functions for our specific needs.

In short, using smartwear we will be fully exposed and connected 24/7 wherever we go and whatever we do. The optimistic vision is that we can fully control what and who we are exposed to and connected to. The pessimistic vision is that we cannot control what and who we are exposed to and connected to. As such, smartwear will have a major effect on our privacy, both good and bad.

## 4.2 Applications

Eric Topol, leading cardiologist and director of the Scripps Translational Science Institute in La Jolla, California, is a well-known proponent of wireless medicine. In his talk at TEDMED 2009 (Topol, 2009), he gave examples of medical wireless devices and the diseases that could be targets for wireless medicine. For example, the Basis B1 wristband provides a precise view of a person's health immediately and over a period of time. It incorporates five sensors: an optical blood flow sensor that detects heart rate, through pulse or blood flow; a 3D accelerometer, a highly sensitive sensor that detects the smallest movements, regardless of whether users are alert and active or sleeping; a body temperature sensor to measure exertion during activity; an ambient temperature sensor to detect the outside temperature and compare it to body temperature to boost the accuracy of caloric burn calculations; and a galvanic skin response sensor to measure the intensity of sweat output. The band can link to the wearer's personal Web dashboard so that he/she can easily view performance, share data and engage with other Basis B1 users.

The main goal of these wireless measurements is to try to keep the patient out of hospital. Wearable devices such as this can help keep people healthy and prevent them from getting ill. They also can help people recover better after a hospital visit, such as through monitoring and assisting in recovery of heart failure. According to Topol, the ten diseases which are targets for wireless medicine in the U.S. are Alzheimer's, asthma, breast cancer, COPD, depression, diabetes, heart failure, hypertension, obesity and sleep disorders.

When we are connected to a health delivery platform all the time, with our vital signs and other context fully exposed and our biological data and genomics known, apps in a wearables platform can monitor our health and give advice and predictions to prevent us becoming ill. Or they can give us advice on how to manage the chronic disease we may have. These highly personalized care services via smartwear may well be one major trend in the future of healthcare.

## 4.3. Opportunities

**Impact on Society.** Smartwear has the potential to revolutionize the health and wellbeing sector in a number of ways. First, they have the potential to educate and empower people to take control of their health. They place our real-time personal health data in our own hands. Until recently, patients relied on their doctor to check their health status and to treat them. These days, anyone can monitor basic aspects of his/her own health, such as blood pressure, blood sugar level, heartbeat, and so on, from home or even while travelling. Smartwear enables us to educate ourselves and make decisions on issues that affect our health and wellbeing. Perhaps the next phase then is to combine our vital health sign data with other predictive data to devise personalized treatment programs tailored to a patient's risk profile. In the future genomic markers embedded in smartwear will alert doctors to conditions like breast cancer, which can be treated earlier and in that way could reduce the incidences of death due to breast cancer.

Second, smartwear can help doctors and patients better monitor and diagnose disease by sending data about our organ function and disease markers directly to physicians. This allows them to access vital health information while monitoring a chronic disease. As an example, today diabetes patients can monitor their blood glucose levels, deliver insulin, track food intake and activity levels, and transmit all this data to their medical practitioners, enabling them to better diagnose and manage their condition. Potentially this can result in huge cost savings for healthcare providers, such as the NHS in the UK, because it enables nurses to manage patients' health conditions more efficiently.

Third, smartwear can help in medical procedures, as mentioned earlier in our introduction. As an example, a surgical team at the University of Alabama at Birmingham used 'virtual interactive presence in augmented reality' (VIPAAR) technology in conjunction with Google Glass during a surgical operation in 2013, allowing veteran

surgeons the opportunity to interact remotely with less-experienced surgeons and to offer their expertise to them (*Farmanfarmaian, 2014)*.

Fourth, smartwear will increasingly allow us to control and manage ongoing chronic pain wherever we are and whenever we need treatment. For example, the Transcutaneous Electrical Nerve Stimulation (TENS) patch delivers low-voltage electrical stimulation to alleviate pain in chronic sufferers. The patch will soon connect to a smartphone app via Bluetooth so that both sufferers and doctors can track and manage the pain virtually and in real time.

Finally, smartwear will make personal fitness more enjoyable. Current wearable gadgets like the Misfit Shine and Jawbone's UP fitness band help people track and monitor sleep patterns, fitness levels, calorie intake, and bodily functions. By providing goals, challenges and social interactions, they also encourage people to take a more active role in improving their overall health, which tends to make the experience more fun.

Smartwear will revolutionize the way in which patients and their doctors share vital health signs, interact with each other, and make critical decisions about patient healthcare. They will give people greater access to their own current and past health data and allow them to be more involved in their overall health and wellbeing. We envisage that this will result in fewer and shorter visits to doctors and other health service providers, a reduction in the number of unnecessary medical tests, and a higher treatment success rate.

One more economic advantage lies in the electronics that smartwear contain. Köhler, (Köhler, Hilty and Bakker (2011); *Köhler and Som* (2013); *Köhler (2013))* point out that while challenges remain for recycling plants in terms of eco-toxic and human toxic effects that all these new devices may bring, there also exists a great potential in valuable metals recovery gains both environmentally and economically. For instance, a printed wired board (PWB) of a typical mobile phone contains an estimated amount of gold ranging between 368–980 g/ton of PWBs, Silver 3573–5540 g/ton, Palladium in the range of 285 g/ton (UNEP, 2013). Therefore, recovery of these valuable materials should be equally interesting in the case of wearables.

## 4.4. Challenges

So far in this paper we have mostly outlined the positive benefits of smartwear in the future. Here we begin to discuss some challenges. For example, do we really want to live in a brave new digital world where patients are their own doctors and there is no longer a need for us to submit to an interview in a clinical setting? What do we give up and what do we lose when health becomes nothing more than a stream of physiological outputs, a set of data to be parsed and quantified by algorithms managed by faceless medical providers?

Players involved with innovations including research institutes and companies pursuing new areas seldom consider the potential consequences of the new innovations,

especially if these are anticipated to be negative (Rogers, 2003). According to Rogers, *"Consequences are the changes that occur in an individual or a social system as a result of the adoption or rejection of an innovation."* He asserts further that, in fact, change agents are usually just interested in the form and function but not about the meaning of the innovations. Considering both opportunities and challenges is a way to reflect on an innovation from a more holistic perspective. It is about acknowledging the burdens and anticipating the potential suitable mitigation plans and alternatives to execute, if needed.

In the context of smartwear we see challenges related to privacy and lack of lifecycle thinking, for example, in addition to challenges stemming from yet unsolved technical hurdles like power, storage, EMF and interoperability. In this section we briefly look further at challenges ranging from societal to regulatory that may be worth considering in regard to smartwear in the wellness and health sector.

**User-centred Challenges.** Users' willingness to embrace new technologies and to change their behaviours from patient care to self-service and preventive mode remains a challenge. Another challenge is users' willingness to wear actual devices 24/7 while at the same time feeling comfortable. Therefore, user-centric design in wearables is crucial. Wristband curviness, for example, is important to the Finnish company Koru Lab (Lindholm, 2014). Usefulness and ease of use must be ensured (Buenaflor and Kim, 2013; Olson, 2014). Cognitively speaking, there is probably a way to go before all people will embrace the so-called Quantified Self movement where the more data captured the better. However, within the wellness and health sector, needs may be driven by the curiosity to know something specific about one's situation, lifestyle improvement possibilities or simply a potential medical issue (Vanhala and Reijonsaari, 2013). Will these needs transform smartwear from being a potentially physical prosthesis into a cognitive prosthesis (i.e., Baber, 2009)? Hacking the data, albeit a relevant issue, may not always be mitigated in the current designs.

Another challenge may come from users for reasons other than technology. Blumtritt (2013) points out that the core philosophical challenge of the Quantified Self falls on the fundamental question "What self is there to be quantified? He claims that after datarizing 'our self', an object that can be measured, the outcomes of neuroscience or human genetics become tangible. The Cartesian mind and body dualism thus loses its ground, and that may be hard to accept for some people. Putting aside spiritual challenges, from a psychological point of view, some people may resist the Quantified Self technology simply because they want to keep their integrity and be self-reliant and self-determined, especially when it is not yet guaranteed that users will have full access to data collected and to the algorithms that are implemented within wearables.

**Regulatory Challenges.** Regulatory-related challenges include, not least, the privacy of users and the secure transmission of their data through different types of services and applications needed in the health and wellness sector. The health sector is extremely sensitive towards data use, and stringent regulation is a must as "*privacy*

*and security are the backbone of trust in healthcare"* (Healthcare Information and Management Systems Society, 2012,). The main questions include the ownership of the data and its locations along the service delivery line. Qualcomm Life suggests that perhaps individuals should be made owners of their own data (Mobile World Live, 2014). It is worth mentioning that, while the plethora of new devices enters health markets, these devices, applications and backbone elements such as routers (data storage, for instance) may turn them into medical devices that must follow more stringent regulatory requirements, such as labelling and content information (ibid). Furthermore, converging wellbeing and health applications implies convergence of a highly regulated sector with a sector used to little or no regulation. Regulators also may need to address the spectrum allocations for health-related equipment, as the example of MBAN spectrum allowance for medical use demonstrated in the U.S. in 2012 (ibid.).

**Technology Challenges.** Technology challenges are currently revolving around the need for power, storage, interoperability, and EMF- (electromagnetic field) related questions. These questions are further addressed with research to produce printable electronics or flexible displays in order to accommodate the needs of sensing, usability and connectivity. These are also questions surrounding health concerns recently raised for some of the fast developing nanotechnologies and potential occupational health hazards (see, for example, NIOSH, 2013; Sund, Palomäki, Ilves, Rydman, Savinko, Koivisto, Alenius, et al., 2013). Connectivity challenges include the myriad of current devices and their inter-linkages between the elements provided in a given ecosystem. Standard interoperability issues are beginning to be seriously considered by industry associations such as ITU (Healthcare Information and Management Systems Society, 2012).

Smartwear will have to undergo some significant technological developments before they become mainstream. For instance, due to hardware limitations, today's wearables are mostly smartphone-dependent fitness trackers in the form of smartwatches and wristbands.

**Environmental Challenges.** Environmental challenges include end-of-life considerations for the tens of millions of new electronic devices, sensors and textiles. It seems that wearable manufacturers currently lack lifecycle thinking (Köhler, 2011). Lifecycle thinking means acknowledging that a company's product has both positive and negative effects throughout its lifetime. For instance, an extensive roadmap to mHealth (HIMMS, 2012) does not contain anything about recycling or reuse of new devices that are expected to enter the health and wellness market. A typical lifecycle includes raw material extraction, manufacturing, assembly, use and end-of-life options. A full lifecycle assessment (LCA) is a well-established and continuously evolving discipline building around the ISO14040 families from late 1990's, and more recent guidelines on social lifecycle assessment of the products introduced by SETAC/UNEP (UNEP, 2009). Our suggestion is to include at least this type of thinking in the basic requirements for the forthcoming, potentially disruptive new innovations

(see Köhler and Som, 2013). This may even lead to competitive advantage when potential risks (for instance, health, privacy or environmental topics) are identified, prioritized and addressed or at least when alternative mitigation plans are created in the early stages of development. Other solutions proposed by Köhler (ibid.) include labelling of wearables and an industry-wide voluntary database to share information on this rapidly progressing field.

End-of-life phases may bring challenges for companies working in the wearable sector, as well as in waste management (see, for instance, *Köhler,* 2013). Convergence of sectors such as textiles and electronics to create fitness sector-targeted e-textiles to monitor health implies the following challenge: How would two fundamentally different types of industries design new products, for instance, in terms of recyclability? While this is regulated in the electronics sector, it may hardly be even discussed among textile designers (Köhler, 2013). Simply put, electronics are considered dangerous waste when disposed while textiles are not. On a more positive note, new research is in progress in creating potentially some new kinds of disposable electronics, for instance, by using microfluidic assemblies consisting of radios, circuits and sensors to be used on the skin (Xu, Zhang, Jia, Mathewson, Jang, Kim, Rogers, et al., 2014).

## 5. Discussion

In this section we discuss some of the radical changes that smartwear may bring about in the health and wellbeing sector. We use McLuhan's 'tetrad of media effects' to frame our discussion. The tetrad enables a structured examination of a new technology's effects on society. It achieves this by dividing these effects into four categories (listed below).

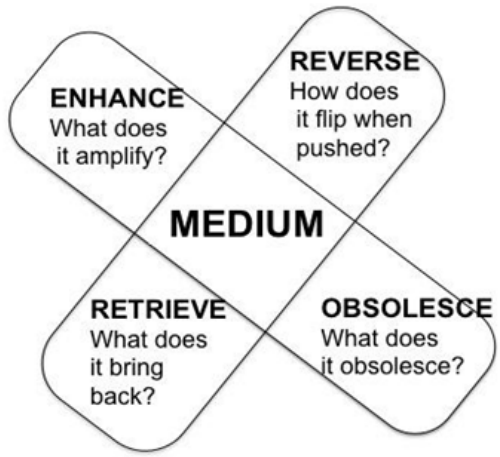


**Fig. 3.** ***Tetrad of Media Effects (McLuhan, 1988)***

## 5.1. What Do Smartwear Enhance?

Smartwear will usher in an era of 24/7 communication between individuals and their communities, between individuals and other smart devices, and between individuals and professional service providers, such as in the health and wellbeing sector. It will be more difficult to switch off 24/7 communication in these smartwear items, partly because constant communication of data, even while we sleep, will be a central feature of wearables.

One result of the 24/7 communication of data in smartwear is that they will be able to constantly monitor the condition of our health. This then enables future wearables to automatically diagnose and treat minor health irregularities, such as headaches and blood pressure, even as we sleep. For instance, our wearables could detect the onset of a headache and, therefore, will inject a pain relief medication to prevent the headache from becoming worse.

## 5.2. What Do Smartwear Make Obsolete?

As smartwear increasingly dominate the market, smartphones as handheld devices will become an inconvenience and as a result they will become obsolete (see earlier section of this paper).

Certain services and building spaces of medical centres and hospitals will also become obsolete. In the future, as wearables enable the health sector to become more preventative in nature and enable individuals to increasingly adopt a self-service model in which they research, monitor and treat their own health conditions from their homes, we will see a decrease in the number of people seeking face-to-face consultation in hospitals, medical centres and general practitioner outlets. This means much smaller patient queues and far fewer people in waiting rooms. The main use of hospitals and medical centres will then be to treat more serious health conditions. We believe that, as a result, hospitals and medical centres will need to make two radical changes. First, they will need to redesign their building spaces as fewer individuals physically turn up for face-to-face consultation and treatment. Second, their medical staff will need to spend more time and resources on serving patients through virtual consultation, monitoring and treatment.

Something similar has been taking place amongst libraries over recent years. The Internet has had a major impact on how people find and access information, and libraries have had to adjust their services and building spaces to these new realities. Today, as people demand more free access to computers and the Internet from their libraries, space allocated to library collections has decreased while seating capacity for library patrons has increased. With the onset of technology, libraries have had to redesign their building spaces to cater to these changes.

Another radical change being brought about by smartwear is that traditional revenue models which are based on a fee-per-service invoicing are becoming obsolete. This is because we will be monitored 24/7 with intelligent algorithms, given advice to

help us avoid getting ill. We then pose the question: What will be tomorrow's revenue models in this smartwear revolution?

## 5.3. What Do Smartwear Retrieve That Had Been Obsolesced Earlier?

Whilst traditional Western societies prior to the Industrial Revolution tended to practice direct, open and constant communication within close-knit communities such as villages and neighbourhoods, Western societies since then have lost this sense of community and have tended to favour a more private world in which personal communication is limited to fewer people and is exercised less openly and less regularly.

The advent of smartwear will radically transform the way we communicate and will bring back the age of direct, open and constant communication within virtual communities or 'tribes'. These communities have been called 'modern communities in network societies' (Hiltz and Turoff, 1978; Martin, 1978; Van Dijk, 1991), pointing to the advent of virtual networks to which we belong. Marketer and author Seth Godin calls them 'tribes': "a human social unit from the distant past", a "group of people, large or small, who are connected to one another" (Godin, 2008).

The sharing economy with its collaborative consumption patterns is emerging, especially in industrialized Western societies, and smartwear will contribute to this wave of increased sharing and 24/7, direct, open and constant communication. For example, there is a growing trend for virtual communities or tribes of road cyclists to track their cycling movements, monitor their vital health signs, and share this data openly and on a regular basis via social media platforms with members of their online cycling community.

When used on a large scale, smartwear have the ability to track the collective health of a tribe. For example, if enough people in a geographic community are tracking and sharing data related to their body temperature, healthcare service providers will be able to track body temperature trends and have the capability to inform connected users about a potential virus outbreak in the community.

## 5.4. What Do Smartwear Flip into When Pushed to Extremes?

As more people purchase smartwear, this will increase the volume of data that is so vital to 'big data' analysts. This increase in data will introduce a whole new wave of news media content. News media companies will increasingly take on the role of 'smart guardian'. News media companies will become more reliant on big data analysis that can interpret the volume of data and turn this into newsworthy content valuable to news media platforms. For instance, Finns may wake up on a Monday morning to read via their smartwear an online Helsingin Sanomat story about a spike in allergies suffered by Helsinki residents over the past twelve hours and a warning

that this trend will continue unless residents self-treat the condition immediately. The story may recommend various allergy treatments, some of which can be self-treated through smartwear capabilities. Earlier, local health authorities will have contacted those affected. In this way the provision and management of health services will become more efficient in time and money.

## 6. Conclusions

One fundamental outcome of the increasing use of smartwear in the health and wellbeing sector is the restructure of the medical and healthcare ecosystem. 'Big data' gathered from personal data banks will be centralized. Platforms will be designed with various features enabling a range of access by end-users, medical and pharmaceutical professionals, caretakers, administrators, researchers and innovators. Data security and algorithm transparency will be dealt with. A doctor can be alerted by the system monitoring a patient's condition and issue treatment when needed. Drugs and medical devices can be 3D-printed or manufactured on demand. Even better, a patient will not become a patient in a modern sense as the system will automatically monitor the end-user's physical condition with explicit statistics and send out alarms when a certain inclination towards an illness is detected. The end-user then will be able to proceed with a self-diagnosis and take action to prevent a worse case scenario from happening.

In this way, the health and wellbeing sector equipped with smartwear will drive current medical services and businesses towards a preventive model. This innovative technology will shape and enhance our physical body, almost like a cyborg. Self-hacking into the biometric security systems, medical imaging and auto-diagnosis will become as common as taking aspirin to cure a headache (Blumtritt, 2013). Hospitals will be diminished. The need for doctors and nurses will be adjusted according to a measurable reality. Pharmaceutical and insurance business will be revolutionized to meet these changes. The transparent and shared personal health-related data will make it easier to fairly distribute the medical and healthcare resources from a governmental point of view.

Smartwear will revolutionize more than the health and wellbeing sector. We predict smartwear will become a widespread mass communication medium with 24/7 communication between individuals and healthcare organizations, the news media and smart government services, and even music and entertainment providers. Communication will be instant, 24/7 and omnipresent.

However, data security is the first major societal challenge that smartwear will encounter. Data transmission or storage of this next-to-your-skin digital device could be hacked, stolen or misused. This harm can be physical and even fatal, as the nature of the data concerns our health. Privacy is a serious concern here. Nowadays in most countries, medical records are considered to be personal and private. Only by a court

order can health records be accessed by relevant third parties. But this may no longer be the case once smartwear becomes our health guardian. In the end, what do we lose when health becomes nothing more than a stream of physiological outputs, a set of data to be quantified by algorithms managed by faceless medical and healthcare service providers? As we 'datarize' our 'self', can we still keep our integrity and be self-reliant? The answer may be positive as end-users become more aware of their digital data power and personal rights and act accordingly against external control over our personal data.

**Face-based Smartwear to Take the Lead?** We predict that the most popular form of smartwear in the future will be around the face, such as current models of eyewear like Google Glass. To users who are seeking wearable technology to enhance their health and wellbeing, these smart glasses offer more advantages than other smartwear such as smartwatches and wristbands. To begin with, smart glasses can measure blood sugar levels using ear-based glucose meters without requiring diabetics to prick their fingers. Companies like Grove Instruments and Integrity Applications have been testing and undergoing FDA trials for ear-based glucose meters, which can be placed on the arms of the glass frame which sits just above the ear. The ear is also best suited for capturing certain sensitive biometric data. Dr. Nitan Verma, a sleep medicine physician at the Washington Township Center for Sleep Disorders in California, argues that the ear is probably the best place to collect sleep data. Dr. Verma argues that wearable devices on the wrist, such as a smartwatch or wristband, cannot provide these accurate data (Fechter, 2014).

Another advantage of smart eyewear is that being close to the mouth and the ear, it offers the capability for users to speak into a hands-free microphone and to listen to music or speech via micro speakers in or close to the ear. We believe that voice communication is set to become even more important in the future as people prefer hands-free applications and fewer text-based applications.

Compared to eyewear, wearables on the wrist or integrated into textiles have less advantages. For example, a smartwatch's small screen limits the ability to communicate text and images to the user. It also limits the ability to listen to sound and speak into a microphone without raising the watch to the ear or mouth. It appears that almost anything smartwatches, e-textiles and wrist bands can do, smart glasses can do as well, if not better.

**Smartwear Are Here to Stay.** There are a number of indications that smartwear in the health and wellbeing sector are here to stay. First, the 'gang of four' Amazon, Apple, Facebook and Google have created an ecosystem of partners, developers, users, customers and communities, and these social/business platforms have paved the way for people to monitor, communicate, share and make money from smartwear technology.

Second, the cost of entry is still relatively low enough that large numbers of people are trying smartphone apps and wearable devices in order to improve their health and wellbeing. This trend will speed up as the unit cost of smartwear decreases.

Third, the range of smartwear in the health and wellbeing sector is exploding so that almost anyone can discover an app or device that suits his or her interests. Fourth, the quality of smartwear is improving dramatically, offering better sensors, social engagement around wellness behaviours and achievements, hardware that offers more measurements, and enhanced aesthetic appeal. Fifth, people are discovering more ways to self-health services via smartwear. As the 'healthier lifestyle' and Quantified Self movement blossom in the coming years, this will boost the uptake of smart wearables in society.

Finally, players in the health and wellbeing sector are fast recognizing the financial and social advantages of catering to a smartwear industry, leading to innovations in service and technology in this growing sector. Government leaders of healthcare in heavily populated Western nations such as the United States are attempting to head off chronic disease, manage population health, and make health and wellbeing providers more productive. As they increasingly recognize people's interest in the 'quantified self' (QS) and the smart wearables' capabilities to take advantage of this QS revolution, government and business leaders in the health and wellbeing sector together will realize that the potential to create value is enormous.

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# Ethical Personalisation Act 2025

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**Abstract.** "Personalised search means nearly every result returned within a browser is altered one way or another. It's rare that two different people on Earth ever see the exact same set of search results.[1]" This paper looks at the ethical implications of personalisation in the context of information filtering systems. For example, how is media content filtered online and made available to users by the use of algorithms? Currently this is done by social media, search engines and commercial players like Amazon, Netflix and Spotify. At this time, personalisation has been explored in the contexts of marketing, information systems and human–computer-interaction. How-

1 http://moz.com/blog/the-ethical-issues-of-personalisation-online

ever, the current problem is that the personalisation filters bias the content we see, and little is known about whether a 'good' result from the user's or search engine's perspective also reflects the greater good. This research gap leads to our research question, with which we broaden the examination into the future: "What is ethical personalisation in the context of information filtering systems in 2025?" Our premise is that personalisation increases, and more personal data, such as emotional state, are used in the future in order to make personalisation even more relevant. Moreover, we claim that algorithms replace the human factor in gatekeeping. We also claim that ethical personalisation benefits all stakeholders. In conclusion, we present the ethical code of personalisation.

**Keywords:** personalisation, ethics, information seeking, information filtering, user context, serendipity

## 1. Introduction

This chapter looks at one of the current main trends and its implications: big data and the datafication of our lives. The amount of information increases exponentially, and it is becoming increasingly challenging to find the needed or desired content. To aid people in finding the relevant information, companies have developed automatic algorithms that shift through the vast amounts of data, pick a relevant subset, and present only that subset to the user. These filtering algorithms utilise the user's personal data, thus making the filtering personalised. E-commerce sites use recommendation systems to recommend certain products to users, social media sites filter their users' news feeds, and search engines personalise the search results. However, bringing clarity into the information flood is not without implications. Personalised information filtering shapes information flows, and this shapes what we know and can have wide-ranging practical implications: for example, who we meet and what we do. A general awareness of personalisation and its implications is still lacking among end-users, and there has not been open discussion about what the end-users want and allow.

Eli Pariser raised questions about the power of algorithms and their effect on our lives in his book *The Filter Bubble* (2011). In academia, this topic has been approached among others in the following contexts: marketing (Fink Josef, 2002), information systems (Billsus and Pazzani, 2002), human–computer-interaction, Internet studies (Willson, 2013), digital media (Beam, 2013), and computer science (Garcia-Molina, Koutrika and Parameswaran, 2011; Liao and Fu, 2013). In this chapter, we continue this discussion about the ethical aspects of online information filtering by shifting the focus further into the future. We map the upcoming possibilities of information filtering what new data there will be and how it can be used and

reflect on the implications. The research question of this chapter is: What is ethical personalisation in the context of information filtering systems in 2025?

We see four main contexts in which personalised information filtering currently takes place: *search engines* such as Google where users actively search for information, *social media* such as Facebook where users can passively follow the information flow, *e-commerce* such as Amazon that offers personalised shopping services, and *news* such as News360 that offers personalised news services. In this paper, we concentrate on search engines and social media, as they include the largest and the most influential players in our everyday lives, and their agendas are not as clear as are those of news and e-commerce companies. In the case of search engines and social media, the illusion of objective and common content is still strong. We will refer to Google and Facebook, the two current undeniable giants, as case examples. Our examination focuses on the ways in which information filtering affects individuals' view on the world and how 'reality' is presented to the user. Therefore, we do not touch upon the equally important issues related to privacy; instead of the ownership of the data, we are studying the use of the data and the consequences of the use.

It is worth mentioning that our examination is affected by the political and cultural context in which we are looking at it and in which the majority of the authors of this paper have lived most of their lives. All authors of this paper live currently in a Scandinavian society in which the government protects its citizens' rights more extensively than in some other societies, for example, the United States. The cultural differences between these two Western societies might actually explain some of the tensions around the online practices and ecosystems; the giants of the online world all come from the liberal society of the United States where individuals are responsible for themselves and their worldview. In that context, it seems more culturally acceptable that one makes business at the expense of others' personal data not considering the possible negative implications, which would be illegal in the majority of European countries.

In the next section, we review the current state of personalisation. In Section 3, the implications of personalisation are discussed. In Section 4, we map the future of personalisation: for example, what new data will be used, and how will our emotions be taken into account? In Section 5, we discuss the ways to secure ethical personalisation and the responsibilities of different players, and eventually we draw up an ethical code. In Section 6, we conclude by saying that the whole ecosystem must ensure ethicality: the biggest responsibility lies naturally on the service platforms and regulators, but the pressure from the users would be the most powerful means of forcing the online service platforms to act ethically.

# 2. Personalisation Today

Today, personalisation is deployed into many online *information seeking* service platforms. In this section, we first present the ecosystem of those online service platforms: who the actors are and how they interact with each other. We then briefly introduce the existing filtering methods and, finally, we outline the details behind today's personalisation algorithms.

## 2.1. Actors

In personalised information filtering, the actor network in which personalisation takes place is increasingly complex because of the business opportunities the field offers. Scholars focusing on advertising (Evans, 2009) and information content (Willson, 2013) have different approaches to the actor network. Trying to elaborate on both views and considering the possible impacts of manipulating parties to the filtered information content, we attempt to draw a focused picture of five crucial players between which personalisation takes place: the end-users, the online service platform, the advertisers, the manipulators and the regulators. We use the concept of *online service platform* to refer to online services that carry out personalised information filtering (e.g., Google, Facebook, Amazon, or News360). Some scholars make a division between developers, platforms, and publishers, but in our actor model, they are considered to constitute the online service platform.

Fig. 1 visualises the actor network in the contexts of search engines and social network sites. Even though the platforms are different Google offering an information filter through which end-users actively search for information, and Facebook offering a social network of information flow that the end-user can follow either passively or interactively the principles regarding the ecosystem are alike.

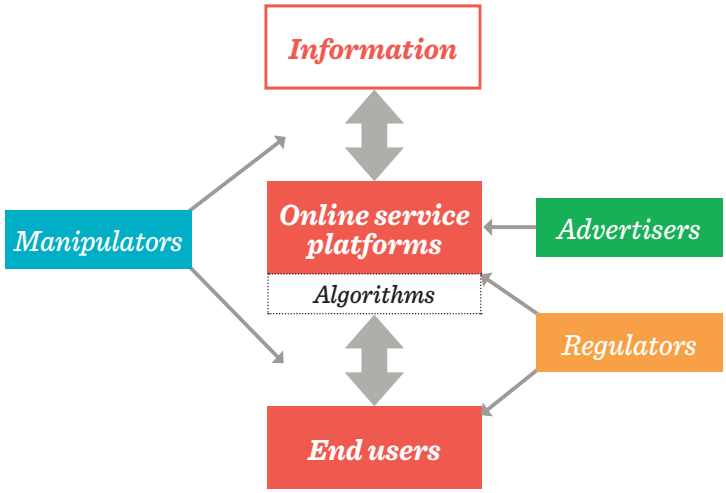


**Fig. 1.** ***Actors involved in information filtering.***

An *online service platform*, such as Google or Facebook, connects the *end-user* to the information, collects data from the end-users, and connects the *advertisers* to the users. As a default setting in both platforms, the end-user provides information for the *online service platform* by acting in the virtual platform. Developers that usually work for the online service platforms are constantly developing more complex algorithms and applications that aim at filtering the relevant information, based on which the resulting information chunk is delivered to the end-user. As a side product, the end-user also sees targeted advertisements that the algorithms consider relevant based on the information collected from both the end-user and the advertiser.

To provide the end-users the information filtering service for free, it is funded by advertisements. For the *advertisers*, it is relevant how many active, potential, real life end-users the platform has and how well their advertisements can be targeted to the potential end-users. This is the simplified, most powerful earning logic of the online service platforms they collect more and more precise data on an increasing amount of individuals using their service to provide the advertisers more and more precise targeting.

*The manipulators* can manipulate search results through legal (white hat) and illegal (black hat) search engine optimisation (SEO) actions to get better visibility or wider audiences for their products or agenda (Goodman, 2006). Companies use SEO widely to manipulate Google's algorithms (Krotoski, 2011) so that some sites gain more relevance and rank higher on the results. As a consequence of employing the so-called black hat SEO that search engines consider a violation of their terms, Google, for example, banned BMW from their listings in 2006 for a short period of time. In Facebook, the advertiser does not necessarily know the amount of genuine profiles

and whether their campaigns really reach the ones they target (Veritasium, 2014). Some firms have been accused of buying likes from click farms in order to gain visibility. Especially in the social media context, guerrilla advertising and manipulators change the rules of the game. An end-user is not necessarily capable of knowing what is content and what is ad, which likes are bought and which are not.

The *regulators* such as nations, states, courts, or global organisations should be capable of changing the rules of the game. For example, they can set laws for data collection, sharing, tracking, and personalisation in general. However, as the global development of the platforms has been rapid, the regulators that mainly exist on the national levels have not been able to react fast enough. The regulations are created on the go and are largely dictated today by commercial players, such as Google and Facebook. Thus, the long-term consequences can be radical, as individual players grow into monopolies, gain enormous amounts of information they know how to utilise, and are capable of dictating their own rules.

## 2.2. Personalisation Filtering Methods

Personalisation can be categorised based on the type of data used. In collaborative filtering, people's preferences are predicted by comparing their behaviour history with other people's behaviour history. For example, if person A has liked news articles 1, 2, and 3, and person B has liked articles 1 and 2 but has not yet seen article 3, collaborative filtering predicts that B will also like article 3. For collaborative filtering to work, it requires that there is enough behaviour data available. Therefore, it does not work for novel content. Another filtering method is content-based filtering, where content is analyzed and compared with a user profile that is created by a machine-learning algorithm. In our example, the algorithm could create a profile of person A based on the textual content of articles 1–3, and thus predict whether he will like article 4, which nobody has rated yet. A third method is rule-based filtering. The rules can be set by the user or the online service platform. For example, the user could set a rule that filters out all news articles written before 2010, or the online service platform could filter out all adult-themed articles from underage users. Most information filtering systems combine collaborative and rule-based filtering into a hybrid filtering method because they are easy to implement. Content-based filtering is not utilised in most fields yet, because analyzing the content is a resource-intensive and challenging task.

The above example of collaborative filtering was very simple and based only on binary "like" data. In reality, however, the current collaborative filtering algorithms use several data sources. For example, when evaluating the relevance of a new feed object for a user, Facebook uses the affinity between the creator of the object and the user, the weight of the new object, and when the object was posted. These three components are the ones publicly known about the Facebook's EdgeRank algorithm. Affinity is defined by how much the user has interacted with the creator, e.g., clicks on

links, likes, shares, and comments, whereas the weight of the object is mostly defined by its type and popularity. New objects get visibility because of their novelty and the affinity between the user and the creator. If the new object is the user's close friend's wedding photograph with hundreds of likes and comments, it will more probably appear in their news feed than a remote friend's status update with no comments or likes. The exact algorithms used by the companies are well-kept secrets, and, even though we know that Google uses GPS location data from our mobile devices, we do not know exactly how the data is used to filter our search results.

Even the goal of personalisation is not known, except for some publicly made comments that outline the goal to be providing relevant information to the user. The definition of relevance, however, is very subjective. Mark Zuckerberg has said, "A squirrel dying in your front yard may be more relevant to your interests right now than people dying in Africa." We argue that while the squirrel dying might be more engaging, famine in Africa is still more relevant. The underlying goal of the companies is to provide value to shareholders, and Google and Facebook do this using advertising. Thus, by providing engaging content to the user, the companies can maximise the time users spend using their service and are exposed to the advertising. Another, and perhaps a more substantial, benefit of personalisation is that the same data collected for personalisation can be used to target advertisements. It is clear that the users and their data have become a commodity. Now that more and more people use personalised information filtering systems to get their news, form their worldview, and create their identity, the ethics of such systems should be examined as closely as the ethics of journalism.

## 2.3. Personalisation Algorithms

In this section, we will discuss the personalisation algorithm at its technical perspective. The section is structured as follows. First, we briefly repeat the motivation behind personalisation in modern information-providing mechanisms, and then introduce two types of these modern mechanisms. Second, we examine available algorithm toolkits that mechanisms can utilise to recommend to users the information that might interest them. Finally, we investigate the sources of personalisation based on which the information-providing mechanisms provide effective personalised assistance.

**Personalisation: A Technical Overview.** The Internet has no shortage of information. The challenge is finding the right content for you: something that will answer your current information needs. At least two types of information providing mechanisms have been developed over the years to satisfy user information needs (Garcia-Molina et al., 2011):

A *search* mechanism requires that you are looking for something specific that can be formulated as a keyword query. The mechanism, sometimes called 'search engine', explicitly takes the keyword query as its input and returns a list of objects (e.g., documents, songs, movies, books) that somehow match the query. This traditional

search mechanism used to have two primary challenges that have been increasingly addressed by the modern personalised search engines. The first one is in assuming the users know what they are looking for and write a proper keyword query. Unfortunately, this is not always the case. For example, a user may not even know what to look for and end up browsing sites looking around for things that "might interest them". The second challenge is that search engines ordered their results based on the small amount of information available in the keyword query, rather than individual user interests. Thus, all users saw the same results for the same query, even if they had different interests and backgrounds. To address the two discussed issues, personalised search that takes user profile into account has grown popular during the past decade.

A *recommendation* mechanism typically does not require explicit query but rather implicitly analyses a user profile, e.g., what the user has recently read, written on Internet sites, or what the user likes, and if available, contextual information such as where the user is and what he is doing. Based on the analysis, it recommends to the user a list of objects (e.g., friends, products, movies) that may be of interest and relevant at the time.

Figure 2 illustrates a summary on the two *information-providing mechanisms* (or sometimes referred as *information-filtering mechanisms*). In the search mechanism, or the *information pull* model, the search engine explicitly takes user query as input. The engine expands the query with user interests to make a personalised query. A list of objects matching the query is then presented to the user. In the recommendation mechanism, or the *information push* model, the mechanism implicitly monitors the user's activities and constructs a user profile, based on which the mechanism automatically recommends to the user a list of objects that might interest them. In both models, there is a feedback loop that examines how satisfied the user is with the recommended information, e.g., does the user choose the first result or not? The feedback is utilised to improve the user profile for better recommendations in the future.

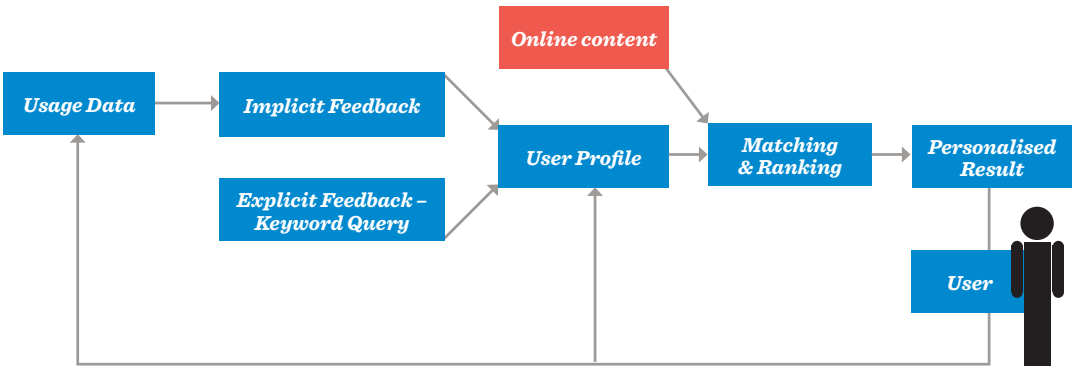


**Fig. 2.** ***Implicit and explicit feedback are used to learn and update the user profile used during personalisation (redrawn from Micarelli, Gasparetti, Sciarrone, and Gauch, 2007).***

**Personalisation Strategies.** In this subsection, we discuss how different information filtering mechanisms employ personalisation.

A *search* mechanism functions typically so that the search engine has already run the so-called *ranking* algorithm that matches a large collection of objects with the keyword query given by the users and orders the returned results. A famous ranking algorithm is the Google's PageRank algorithm that tries to measure the importance of all available websites on the Internet. PageRank defines the importance of one website as the number of URL links referring to this specific website. After that, a list of words appearing in the website is collected. If a user searches for "Apple", all the websites that include word 'apple' are collected and presented top-down based on their importance.

In reality, however, search engines are more complex. Fig. 3 illustrates three primary methods incorporating the personalisation functionality into the *search* process. In the first method (a), the search service platform extends its algorithm to take inputs as both user queries and user profile. In the second method (b), the user-given keyword query is extended with user interests. For example, a simple search "*car*" can be extended to "*car* + *second-hand* + *Helsinki*". These user interests are derived from information such as "you are middle class in Helsinki, searching for a job requiring driving license and recently browse used-car websites". The extended keyword query can then be entered to the traditional ranking algorithm, and the matching results are returned to users. In the final method (c), before the matching results are returned to users, they go through another ranking algorithm, so-called *conceptual ranking*. The conceptual ranking utilises the user profile to remove irrelevant results and reorder results in a more pleasant way to the users.

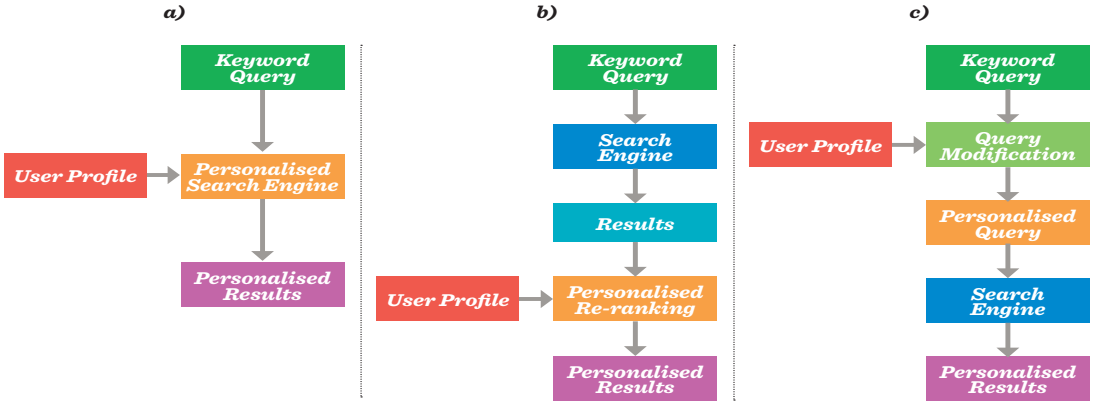


**Fig. 3.** ***Personalisation processes. User profile is utilised during (a) the retrieval process, (b) re-ranking or (c) before the query (redrawn from Micarelli et al., 2007).***

*Recommendation* mechanisms appear all over the Internet, and, in contrast to search engines, recommendation systems that utilise personalisation have been developed quite recently. Examples of services that utilise these mechanisms include an e-commerce website that can recommend to you products that might interest you, a video rental website that can propose to you movies and TV series that fit your preferences, a video hosting service that suggests to you interesting clips people are sharing, or a social networking website that lists your friends' status updates that might interest you. Recommendation systems can be broadly categorised into two types: *content-based* and *collaborative filtering*.

In the content-based systems, the similarity between items that you have rated high and a new item implies your high interest in the new item. Although content analysis is not widely used yet in personalisation, some methods use at least information about the content type. One such example is Facebook's EdgeRank algorithm. Facebook News Feed displays only a subset of the stories generated by your friends. Below is the formula of the EdgeRank algorithm, sometimes referred as *News Feed Optimisation*. The $\boldsymbol{u}$ value reflects the key concepts behind content-based systems, while $\boldsymbol{w}$ and $\boldsymbol{d}$ values are additional algorithm inputs: $\boldsymbol{u}$ is the affinity between viewing users and creators. In practice, if you send a lot of messages to someone and check their profile continuously, the $\boldsymbol{u}$ value is high and you will see more items created by that person. The information weight is $\boldsymbol{w}$. For a news item, comments have higher weight than likes. The more comments an item has, the more popular it is. Finally, $\boldsymbol{d}$ is the time when information is created. The longer time the item is, the less important the algorithm considers it.

$$\sum_{edges} u_e w_e d_e$$

In the collaborating systems, all item ratings by all users are taken into account. There are many approaches in this strategy. The most popular one is the *model-based algorithm* in which the users are modelled and grouped based on their past ratings, e.g., a group of female users who like horror movies. When an item generates interest among many users in a group, it implies that all other users in that group might find the item interesting.

**User Profile.** User profile construction is an important component of any personalisation systems. The user profile tells what a user is and should not be mixed with the user context, which means where a user is and what a user is doing. The user profile is usually deduced from the user's past online behaviour, whereas the user context is usually deduced from the user's *current* information (e.g., user location; the opened websites, documents, email). Even though, compared with the user profile, the user context provides better understandings of the users, it is still under-used in most personalisation systems.

Such data that can be stored with the user profile include *user interaction history* (e.g., the past online behaviours can be tracked by Google bugs), *search history* (e.g.,

past queries and selected results), *user preferences* (e.g., what users like), *demographic information* (e.g., age and gender), and *rich user models* (e.g., user feedback on online items). The system uses bugs and cookies to collect users' online behaviour and asks users to fill in questionnaires related to their preferences and demographic information. In case the system cannot explicitly get the user preferences and demographics from the user, the missing data can be tracked and deduced from the online usage of the user. However, this method does not guarantee a correct profile.

To sum up, personalisation happens today in a complex ecosystem where more and more specific data on individuals is collected and more relevant data is offered through increasingly complex algorithms and filtering methods.

## 3. Implications of Personalisation

Data about our online behaviour, our interests, and ourselves is collected in order to provide us information that we find relevant. At first, this sounds fair and unproblematic, but as, for example, Pariser (2011) and Willson (2013) have brought forward, complicated ethical and social issues are related to information filtering, both on the level of the outcomes of the filtering and the politics of the filtering itself. Thus, in this section, we critically observe some of the possible implications of information content personalisation if it continues evolving as it seems to be evolving today. First, we briefly review ethics and its meaning in the context of personalisation, and, second, we concentrate on the social implications of information filtering.

### 3.1. Ethical Pitfalls

Ethics is the philosophy of the moral; it examines what is right and wrong conduct. One way of defining ethical issues is to say they are questions to which no unambiguous, clear and socially acceptable answers can be easily found (Clarkeburn and Mustajoki, 2007, 23). Ethics is part of all social action and naturally also the online environment where social life increasingly takes place. Laws and regulations usually support morality in societies, and, therefore, we first discuss the special characteristics of the Internet in relation to regulation, before moving on to the ethical challenges of personalisation.

**How to Regulate the Internet.** The Internet as a decentralised system, Web of the webs, is particularly susceptible to ethical questions, as there is no established culture or norms; instead, everything is in a constant state of flux. No one manages the code of conduct or what is accepted. Yet, many players with differing interests and power differentials are engaged, and big financial interests also are involved. The traditional rulers ~~-n~~ations and federations ~~-h~~ave a marginal role in the digital environment. National laws do not apply in the Internet as a whole, and in any case, the real world's regulations are not sufficient to answer the challenges of the digital world. As Erik

Schmidt and Jared Cohen (2013) write, the Internet is the world's largest ungoverned space. Online, the biggest and most powerful players today are commercial, such as Google and Facebook, and they currently get to set the norms of online practices with their own policies. For example, *behavioural tracking*, i.e., tracking of our online activity, is already a big phenomenon and a fast-growing business, but with very little regulation, very few rules, and not much consumer protection.

Freedom and non-regulation have been the main characteristics of the Internet for a long time, but the first attempts to define guidelines for the digital environment took place already in the 1970's in the form of Fair Information Practices in the U.S. As the Internet has become such an important and powerful arena, it seems to have come to a crossroads, where its governance and ethics are starting to be more seriously and extensively discussed on many fora and levels. For example, in the United Nations, EU, several national legislative organs, and different global coalitions, and most recently at NETmundial—The Global Multistakeholder Meeting on the Future of Internet Governance that took place in Brazil in April 2014. Regulating the Internet is, and will be, difficult as no one has the authority to pass sanctions, and new creative ways to avoid existing regulation can always be found. An extreme example is Google's plan to create enormous floating working environments that can operate in the ocean, out of the reach of mundane laws and where technologists can safely try out new things[2]. In the discussion section, we present one suggestion how the ethical management of the Internet could be implemented.

**Transparency and Awareness.** The central ethical issues around the current personalisation and information filtering practices relate to transparency and awareness. Information filtering is a commonplace practice among the big commercial service platforms, but the exact purposes of the filtering the operations or the processes that lead to the information filtering are not open to the users. Nor do the users know what information they are being excluded access to and what is invisible to them (Willson, 2013, 10). As Bodle (2011, 321) notes: "Present conditions for sharing through social applications include a lack of control over one's own information, a lack of transparency as to what information is being collected, and how this information is being used undermining privacy, data security, contextual integrity, user autonomy and freedom."

An open discussion is missing about what data is collected, how it is used and what is appropriate, and the role of algorithms and technology are generally poorly understood; how the technological design affects people's lives and has political consequences, enabling and also limiting various actions and practices (Willson, 2013, 9). As Lessig (2006, 5) writes, in the online world code is law: code dictates what is possible and what is not. Currently the big players are operating safely behind the curtains, and the users do not have any voice in determining the code or the per-

[2] **http://www.businessinsider.com/google-ceo-larry-page-wants-a-place-for-experiments-2013-5#ixzz30IXS7tf5**

sonalisation practices. Recently, the big European publishing house Axel Springer strongly criticised the monopoly of Google and pressed for more transparency (Döpfner, 2014).

More and more functions are based on skilful use of data. Data equals knowledge and power, and, in consequence, asymmetry in data and knowledge equals asymmetry in power. The users' role currently is subordinate. Many services require that users agree with their terms of service, which are long, complicated, and most likely not read by the majority of users. Moreover, the service platform may change the terms and conditions afterwards, e.g., Google states: "We may update the Terms in the future, and you will be able to find the most current version of this agreement at http://www.google.com/a/help/intl/en/users/terms.html." In practice, users do not even have a proper choice of opting out unless they are willing to shut themselves out of widely used services and, in consequence, out of many social contexts. As Döpfler (2014) writes: "the statement 'if you don't like Google, you can remove yourself from their listings and go elsewhere' is about as realistic as recommending to an opponent of nuclear power that he just stop using electricity." In brief, the current situation is such that to the users, the benefits of many online services are visible, but not the hindrances.

### 3.2. New Age Tribalism

Implications of information personalisation include tribalism. Tribalism can be defined as "a way of thinking or behaving in which people are more loyal to their tribe than to their friends, their country, or any other social group" (McMillan Dictionary, 2002). We are not claiming tribalism happens because of personalisation only, but it is an accelerating force with pros and cons.

Information personalisation enables efficient tribalism when a group of individuals interested in a certain theme find each other and start building thematic global and local communities. These sorts of tribes have existed for thousands of years but, before the Internet, not to mention social media, they tended to be more or less local. In the modern age, according to Tuominen (2011), tribalism has been manifested by, for example, consumer tribes sharing consumption values and preferences related to brands, bands and ideologies. Kozinets (Cova, Kozinets, and Shankar, 2007) points out two antecedents of tribal membership in an online context: the centrality of tribal consumption to a self-concept and the intensity of social relationships with other members of the tribe. The consumer tribes differ from the historical ones also in terms of social order their grouping is based on something emotional rather than rational, and the status within a tribe is achieved by different and specific values (Cova et al., 2007).

Today, social media has made it easier than ever to find like-minded people, share the passion and even make a living out of a niche theme, as the whole globe is a playground for anything one can imagine (Albers, 2010). Reich (2014) argues that the increasingly interconnected and globalised world diminishes the role of states,

growing the impact and role of tribes. At the same time, it becomes easier and easier to start living in a bubble with those like-minded people and base the whole world-view on thoughts shared in the small community. One of the founders of the World Wide Web even sees the social networking sites and other closed platforms as a major threat for the future of the Internet, fragmenting its structures from an open platform towards multiple closed systems storing closed silos of content (Berners-Lee, 2010).

The impact of tribalism can be both positive and negative. A simple positive example of a social-network-enabled global tribalism phenomenon is Restaurant Day, which collects cooking and food enthusiasts together in the physical world to set up amateur restaurants for one day. On the other hand, a negative tribalism phenomenon from an individual point of view can be seen, e.g., in the fragmented structure of the United States with conservative Republicans and liberal Democrats or the collision of values between European Ukrainians and Russian Ukrainians tearing the nation apart (Reich, 2014).

An extreme view of tribalism is that people start connecting more and more intensively into tribes, whereas nations, countries or other traditional organisational units as we know them today start losing their importance in the course of time (Reich, 2014). In the long run, individuals could base their identity on multiple tribes they belong to, unattached to where they come from or where they live.

### 3.3. Echo Chamber, Popularity Bias, and the Filter Bubble

Another implication of information personalisation is the echo chamber. An echo chamber is a closed environment with a positive feedback loop. In the context of media, it means that information, ideas, or beliefs are echoed back from other sources, thus reinforcing the information, ideas, or beliefs. Eli Pariser calls the echo chamber created by filtering "the filter bubble" (Pariser, 2011). In social networking sites, it is easy to see how this is happening already today. Interacting with posts on Facebook increases the likelihood of seeing more posts from the same author at the expense of other authors' posts. After a while, the user is left with a newsfeed filled with like-minded friends' posts. In the future, when the filtering algorithms evolve towards content-based filtering, the little diversity that remains could be in jeopardy, as the user is left with only like-minded friends' like-minded posts.

Popularity bias is another effect that personalisation algorithms amplify. It is initially the result of authors attempting to create popular content. Then, because the algorithms weigh the information relevance based on how many people have viewed, clicked, liked, or shared it, the algorithm favours the popular among the content that is already created to be popular. If the current trend of personalisation continues, popularity bias combined with the filter bubble will create to an even greater extent a fertile breeding ground for narrow-minded ideologies.

### 3.4. Gatekeeping

Gatekeeping theory has returned to the spotlight in research as the Internet has made it easier for almost anyone to publish nearly anything without the gatekeeping of traditional mass media; a shift of power from the gatekeepers to the audience has occurred. Gatekeeping is defined as "... the process by which the vast array of potential news messages are winnowed, shaped and prodded into those few that are actually transmitted by the news media" (Shoemaker, Eichholz, Kim and Wrigley, 2001, 233). Gatekeeping has been called the vanilla ice cream (Roberts, 2005) of mass communication theory, which has "appeal and plausibility" and applications wider than news decisions (McQuail, 1994, 277). But, it has been argued (Roberts, 2005), that gatekeeping offers little if any predictive power. As Roberts (2005) highlights: "Its chief value comes in summarizing the various forces that come into play as news people make decisions about what messages will be selected to present to their audiences." In this sense, it is important to highlight that these messages may also include ingredients such as a mix of truths, half-truths, and untruths (Stanoevska-Slabeva, 2012).

The gatekeeper offers the most relevant essence, makes vital choices, opens the right screen doors, and excludes irrelevant elements. For example, manipulators (discussed in 2.1) can be considered as gatekeepers. The regulators can *legally* require the changes in personalisation algorithms to meet their political needs (e.g., remove a news item from citizens' search results). Other manipulators, such as third-party manipulators, can *illegally* take advantage of yet-to-be-discovered vulnerabilities of personalisation algorithms to promote the popularity of their agenda, resulting in a biased belief propagated to wider audiences.

Algorithms have been introduced as novel gatekeepers. More specifically, algorithms decide which blogs get more of your attention, what movies you are more likely to watch, which websites you are going to prefer and what news of friends you are more likely to hear about (Klinger, 2013). However, it should be kept in mind that in addition to algorithms, several other factors play a role in deciding whether the offered content will receive real attention or not. While algorithms do choose the content offered at a given moment to a certain end-user, they do not choose the final behaviour of the end-user. For example, even though from a computer screen perspective it might seem that the end-user is watching a YouTube movie, the end-user may concentrate on something else, and the movie may be just another audio-visual element in the background. In other words, it is the end-users who decide whether they really pay attention, watch the movie, or read the blog. In this sense, well-educated people may be more critical towards the content they are offered and be even more selective in consuming it. However, in non-democratic societies such as North Korea and Russia the impact of institutional algorithms may be far greater than in Europe or Scandinavia, where the open nature of the Internet gives crowds and individuals more power.

### 3.5. Serendipity at Risk

Serendipity means a pleasant surprise, an unexpected coincidence or a random event that changes the course of actions. As Krotoski, Jungnickel, and Hammersley (2012) state: "Serendipity is a very relative thing, based on where you are in the world, what time it is, how you feel that day, what resources you have access to, what political regime you live in, and which culture you're from. Some of these can vary day-by-day, and even hour-by hour."

As the amount of personalised content as it is known today increases, the amount of serendipity easily declines: more and more information is filtered based on algorithms that produce search results and information flows founded on what the end-users or their friends have liked or wanted before. If a person is given only what he or she desires, novel knowledge or surprising connections become more rare. A big question is how more serendipity could be coded in the algorithms, as it is difficult for an individual to actively search for coincidences. Randomisation can be easily coded in the algorithms, but, as serendipity is relative, personal, pleasant randomisation, its facilitation is trickier.

Through their initiative called the Serendipity Engine (theserendipityengine.com), Krotoski, Jungnickel, and Hammersley aimed to find out what serendipity means and how it could be measured. They concluded that in order to measure it, both automated and human-powered techniques are required to generate a personalised Serendipity Recipe. The aim of the machine is to create relative randomness by trying to define things an individual pays attention to and put a new spin into them. They identified seven scales based on which serendipitiousness of a person could quite well be measured: *social support* reflecting how tightly you are connected to your nearest and dearest, *creativity* reflecting your ability to see non-apparent connections between things, *physical well-being* reflecting how good a condition you are in, *headRAM* reflecting your capacity to keep things in mind at one time, *attention* reflecting the amount of attention one can pay to surroundings while distracted, *access to knowledge* reflecting the amount of information you can reach easily, and *grit* measuring your tenacity related to serendipity.

## *4. From Liking Towards Needing*

Even though the outlined implications of personalisation might seem naive, scary, or farfetched depending on an individual's attitude, we assume that the technological development strives to provide us with ever more personalised information content in the future. In order to personalise in a more effective manner and provide more relevant results and services for the end-users, an increasing amount of personal behaviour data must be collected. Therefore, this section discusses the potential trends incorporated in the personalisation paradigms of the future through existing and evolving

technologies such as emotion tracking, physiological sensing, and geo-location.

Although we live in a consumption economy, a person is not solely defined by what he/she consumes and likes. Churchill (2013) highlights that personalisation is about individualisation and specialisation. He argues that we need to put the person back into personalisation through, for example, outcome and process personalisation paradigms. In his view, in addition to consumption habits, people are defined also, for example, by the ways they act, the ways they feel, the places they go, the actions they take, the ideas they have and the way their bodies function. The actions of an individual tend to evolve over the course of time, which creates another challenge for personalising information content.

### 4.1. Weak Signals

Potential information for the construction of the user profile that have not been utilised to a full extent include: *geo-location* where content can be personalised based on a person's location detected by his mobile phone or his social media activities, such as Foursquare; *physiological* sensing what a person's physiological and mental factors are, with the help of wearable chips, phone apps or e-diaries, such as Suunto applications, Mood Panda, Stress Check and Sleep Cycle; *fuzzy-logic* where the personalisation algorithm shuffles the results in a pleasantly random way, such as theserendipityengine.com; and *meta-algorithms* where the end-user can decide the sorts of filters he/she wants to see the results through, such as News360 news service.

Examination of Facebook's and Google's recent acquisitions can provide some weak signals on potential future personalisation practices, assuming that they want to maintain and develop the acquired services and collect user information for more relevant personalisation. Since April 2012, Facebook has acquired twenty-one companies[3]. The focus on mobile devices can be seen as a relatively valid factor as five acquisitions are directly related to mobile devices. Regarding the mobile sensing and information collection of human behaviour, four of the acquisitions enable Facebook to analyze or collect human conversations, one focuses on social discovery, one on facial recognition, five on content sharing, five on advertising or marketing, one on virtual reality, one on verification, and one on design. Since April 2012, Google has acquired thirty-six companies[4] with focuses on robotics (seven acquisitions), advertising (five), commerce or marketing, mobile gadgets (eight), mobility or mobile applications (three), Internet security (three), analysing human behaviour such as gestures, expressions, language and social predictability (five), and the five remaining on hardware, cloud computing, photography, and artificial intelligence.

Assuming these acquisitions might outline some weak signals, one can predict the two largest personalised online service platforms still concentrate on advertising as

[3] **http://en.wikipedia.org/wiki/List_of_mergers_and_acquisitions_by_Facebook**
[4] **http://en.wikipedia.org/wiki/List_of_mergers_and_acquisitions_by_Google**

their funding mechanisms, with an emphasis on mobile and wearable devices. Their data collection seems to expand towards a wide range of data on both physiological and linguistic interaction in human behaviour. Facebook still concentrates on facilitating sharing and communication between individuals and groups, and we will see how the company leverages our conversations in constructing our user profiles. Google seems to focus on analysing patterns of human behaviour and linking it with artificial intelligence and robotics. Hopefully, we will soon have our own personal robots that assist us in our daily life and labour tasks. Overall, these acquisitions undoubtedly indicate that more and more data on physical and mental human behaviour is going to be collected, analysed, and used for more personalised commercial purposes.

## 4.2. Emotions

*"One important but often overlooked aspect of human context of ubiquitous computing environment is human's emotional status"* (Tseng and Ho, 2012).

In this era of the ever-growing individual consciousness, integration of emotions into personalisation can produce more fine-grained information on the user at a given moment and thus make media content differentiation more effective (Tseng and Ho, 2012). For example, future news feed and search results may not only have functions meeting different customers' needs and wants, but also functions to meet their fluctuating emotions. In this sense, emotions may provide deeper understanding of consumers, who wish to express their self-image and taste through media consumption on a more sophisticated level.

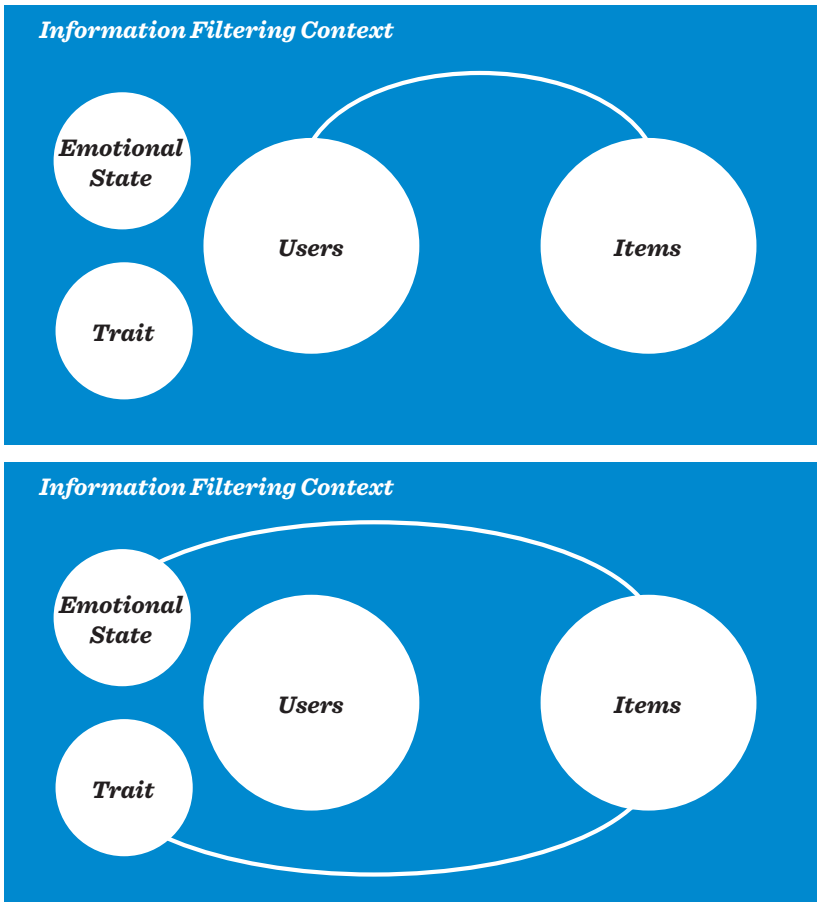


**Fig. 4.** ***Integration of emotional states and traits with preferences***[5]**.**

As to date, personalisation of items such as news feeds and search results has been mostly based on users' demographic data and browsing history. However, in the future the role of soft attributes will increase and personalised items will most probably be based on more fine-grained data such as users' traits and emotional states (Fig. 4). In this sense, with more sophisticated applications that detect and reflect our emotional state online, the online service platforms will have a wealth of data to play with.

Drawing from Basak (2013) and the context of retail, the digital space is used for three things: to inform the user, to personalise news feeds and search results, and last but not least, to draw an emotional connection to the essence of the information (Fig. 5). In this respect, excellence in design of personalised information is about creating a positive, rich, and meaningful user experience through appealing to the cus-

[5] **http://emotionsense.org/**

tomers emotionally. Therefore, we suggest that in order to stand out, the personalised information needs to evoke emotions and go beyond the end-user's rational surface.

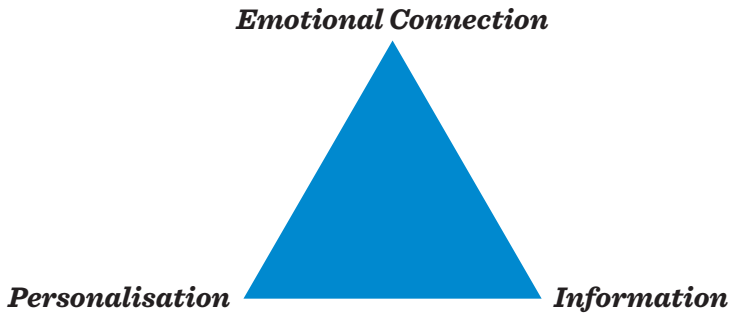


**Fig. 5.** ***Emotional connection in between personalisation and information (Basak, 2013).***

The most widely accepted approach in emotion research is the *valence-arousal dimensions model* (Heller and Nitscke, 2010). Valence is the discrimination between positive and negative experiences, and arousal is the intensity with which the emotion is experienced. There is a multitude of opportunities for open minds in aligning emotions with personalisation. For example, Berthelon and Sander (2013) present a prototype architecture for a system for determining emotion from multi-sensory input. The authors introduce Personalised Emotion Maps to map sensor input into emotion values and explore different types of stimuli expected to provoke similar emotions, for example, satisfaction or joy at either succeeding at a computer game or while watching a favourite movie.

In affective computing, the emotions of human interactions with computational agents are taken as the starting point of the design processes (Lee and Kwon, 2010; Picard, 1997). Autonomic response signals from non-invasive bio-sensors may be used in conjunction with a wearable computer for real-time portable signal acquisition (Lee and Kwon, 2010; Starner and Mann, 1997). In this sense, measurements such as blood volume (BVP), heart rate (EKG), galvanic skin conductance (SC), and respiratory rate are commonly used. Characteristic patterns of these signals correlate with different self-reported emotional states (Lee and Kwon, 2010; Starner and Mann, 1997). It will be interesting to see the upcoming innovations that originate from introducing people's emotional status to personalised information filtering in the context of online service platforms.

**Emotion-driven Personalisation Goes Mobile.** The mobile era drives the increase of opportunities in human-centric service technologies that focus on emotional cues. In this sense, each user can be targeted with more appropriate contents while on the go based on their emotional status. Lee and Kwon (2010) propose methodological algorithms that enable constructing an emotion tagged content repository using

a tagging technique and searching personalised content based on the user's current emotional status.

For example, the Emotionsense application aims at predicting consumers' emotions through exploring how mood relates to our phone's sensor data. This app collects data by asking the users to complete short surveys about their emotions at different time nodes. By clicking on "how do you feel", a longer survey about variables such as mood, location, and activities will follow. Social activity is measured with the number of phone calls and text messages, and physical activity is measured with an accelerometer. The app does not save text messages, and the data about mood and sensors are accessible only to members of the research team, and only for the purposes of conducting research about how mood relates to your phone's sensor data.

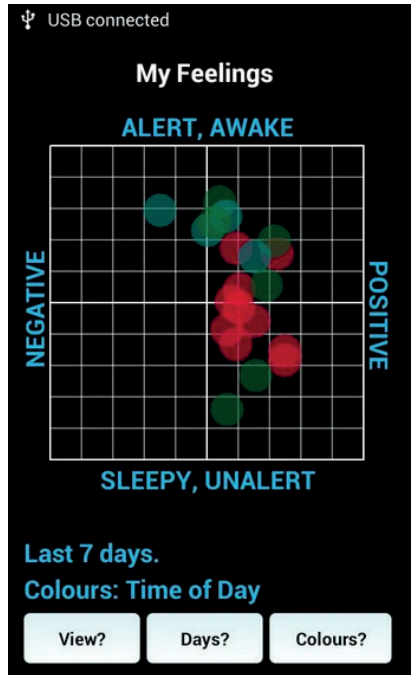


**Fig. 6.** ***Emotionsense application***[6]

Another emotion tracing application is Mood Panda, a virtual diary that keeps track of emotion fluctuations. Mood Panda is also a social network, where users can receive virtual support, for example, virtual hugs from their peers when feeling blue.

Moreover, many start-ups are now building novel software based on empathetic algorithms. For example, a UK start-up, EI Technologies, has developed algorithms that are able to analyse the tonal expression of the human voice, rather than verbal content – with the initial aim of powering a smart phone app that can help people

6 **http://emotionsense.org/**

track and monitor their moods (Lomas, 2013). This empathetic algorithm identifies five basic emotions: happy, sad, neutral, fear and anger. As Lomas (2013) points out: "The system works by looking for 'key acoustic features' and then cross-referencing them with a classification system to match the speech to one of the five core emotions." Another start-up, Beyond Verbal, from Israel utilises empathetic algorithms to identify how someone wants to be perceived, rather than focusing on his or her immediate "emotional layer" (Lomas, 2013).

However, as to predicting emotions, we suggest that same variables may not result in the same emotions every moment and that random coincidences may play a great role. In this respect, it is reasonable to treat relative serendipity based on location, time, resources, political views, and culture as an element to be taken into account in further explorations. Moreover, drawing from Lee and Kwon (2010), we suggest that results are influenced by the way a person observes the world around him as well as by his emotional state at the time when those situations take place.

**The Role of Emotions in Future Algorithms.** In light of the above, we predict that in order to shift from history-looking like-based algorithms towards algorithms that track the current state or even predict the future, elements such as physiological sensoring, geolocation, emotions (see 4.2 Emotions) and serendipity (see 3.5 Serendipity at Risk) can have a larger role in algorithms in the future. Integrating these factors in, for example, Facebook's EdgeRank could have a tremendous effect on the search results in dimensions of time, mood and feel at the very moment the end-user consumes the information flow. More specifically, given that "U" is the affinity between viewing users and creators, "W" the information weight and "D" the time when information was created, what if an emotional factor "E" would indicate what the user feels and expresses while consuming the service? Adding on the factor of serendipity "S", future algorithms could offer the end-user something s/he did not even know s/he was looking for.

Then again, if more and more personal data is collected and not only even based on what people say they are doing or have done before, but what they really are doing or feeling at the very moment, the possibilities for the misuse of the sensitive information and also both negative and positive implications increase.

## 5. *How Can Ethical Personalisation Be Ensured in the Future?*

This paper outlines some of the implications and possible future directions of personalised information filtering. They are brought alive in the utopian and dystopian scenarios at the end of the book. In order to support the realisation of the utopian prediction, we formulated an ethical code for purposeful personalisation. The idea of regulation that would have power over the whole Internet seems unrealistic; for example, how could such a law be accepted globally or who would enforce it. Laws

also have the tendency to be too general for specific purposes and not flexible enough to adapt to the changing circumstances. Therefore, ethical codes are commonly formulated within different professions or organisations. Before presenting our code of ethics, we briefly discuss the premises of the ethical information filtering.

### 5.1. Users Have to Take the Power

The Internet is by nature an uncontrollable environment that highlights openness. It is still lacking a proper social contract: a model to define the relations of different actors and regulation. The social contracts of the real world are shown to be inoperative in the online environment; there have been many attempts to set rules for the Internet, but so far, no global solution has been found. We believe that regulation of the Internet will not be possible to execute from above; it has to originate with the users. The inventor of the World Wide Web, Tim Berners-Lee (2014), has recently expressed his concerns over the commercial and governmental forces taking over online. He has made a claim for a Magna Carta for the Internet and has launched a campaign called Web We Want[7] to defend and claim a Web that is open for everyone. There is wisdom in Berner-Lee's words: *Magna Carta* is the first form of constitutional law, issued in 1215 in England. It is remarkable as it set the law and, in consequence, the people, above the king. A king cannot rule unless he has subjects, and to have his subjects, he had to accept the law. This idea can be applied to the ethics of the Internet as well: the users should be the initiators in setting the rules that online service platforms would be required to comply with ~~ot~~herwise they will not have users. Fair and trustworthy services could be made recognizable with an ethical certificate, and the users could rank the trustworthy services. Only services with *trust capital* will survive.

Currently information filtering is lacking transparency: the big players are operating behind the curtains, e.g., they collect data about us and use it for their own purposes with a hidden agenda. A central enabler for these actions is that so far there has not been any general interest in, or awareness of, information filtering and the power of algorithms. As we wrote earlier, code is law in the digital environment (Lessig, 2006, 5); it determines what is possible and what is not. Empowerment of the users requires understanding the code and the power of the data: what is collected, how it is used, for what purposes and how it can affect our lives and alter the way the world is presented to us. Generating such awareness requires the diffusion of a new skill: code literacy. Already now, such a big part of our activities take place online and are managed by algorithms that the basics of coding and understanding of its role and possibilities should be part of everyone's general education. Policy makers, educators, media, and the online service platforms are key players in building this new literacy.

7 **https://webwewant.org**

We claim that, once code literacy and better awareness of information filtering and its effects have become commonplace, there will be more variety and competition, as people will have the competence to demand fair, transparent services, and the law of supply and demand will ensure the availability of such services. Digitally literate users will choose to use only services where the preferences are intuitively understandable and adjustable, unlike in the current services, which can change their one-kilometre-long terms and conditions overnight. Users can also feed complexity of their online identities and increase serendipity in the information that they are being offered with their own online behaviour by being unpredictable and cherishing diversity.

In such a digitally enlightened world, one's digital profiles could be managed through an online service, which is presented also in our utopian narrative at the end of this book. Some trustworthy party (cf. Finnish online bank services) could provide a profile management service where users can manage their digital identities. One can have several profiles: for example, one professional for work-related information searches and work-related news, and one leisure profile for free time, lacking work-related content. In addition, one could have also a clandestine profile, for example, for socially less-acceptable online activities. The service could even provide imaginary profiles so that the user, for example, could view the world through the eyes of a fourteen–year-old Afghan boy. The user could always choose which profile to operate with and the profiles could be easily edited: hobbies could be removed once they are not of interest anymore and political views revised as one's opinions change.

However, this kind of alternative is functional only as long as the users share a certain level of competence and are willing to devote time on managing one's own data and identities. It is clear that not everyone in this world has or will have the competence or interest. Therefore, we claim that the ethical personalisation has to be built into all services that filter information. The settings should be ethical by default, without any action or proactivity required from the user. The opt-in principle should be used: no information filtering is done unless the user specifically agrees to that. User interface should be intuitively understandable and simple. When content is personalised, it should be explicitly clear, that just one view on the world is being offered, like in News360.com, and most preferably the diversity of the options available and left out should be communicated to the user, e.g., with a visual user interface like SciNet[8], designed by HIIT. Service platforms should aim at producing serendipity and variety in the content ~~an~~d not just filtering content that is known to match the user's interest profile, based on the browsing history. The algorithms should be built so that they constantly test the user by offering results outside the known core of interests; users must be seen as dynamic creatures with changing opinions, interests and needs, and not as a static profiles.

8 **https://www.hiit.fi/node/2659**

## 5.2. Actors to Whom the Ethical Code Is Targeted

We need to acknowledge the power of the algorithms that shape our worldview and understand the impact of the largest players, their motivations, and their ability to dictate their own rules. The players are commercial companies, whose goal is to make money and there is nothing bad about it, but they should not be able to operate behind closed curtains we should know what our data is used for and what the agenda is behind the information we get.

Moreover, if we try to achieve a mutual understanding on the rules and the principles, we assume the services will be more secure and better in the long run. Four stakeholder groups on different hierarchical levels should understand the rules, principles, and responsibilities. First, the users who are assumed to have the least knowledge on the implications; second, the educators who should function as interpreters between the end-users and the online service platforms; third, the regulators who should protect the users while enabling companies to thrive; and fourth, the online service platforms who have the strongest and most direct influence over the code and, in consequence, the biggest responsibility on the implications.

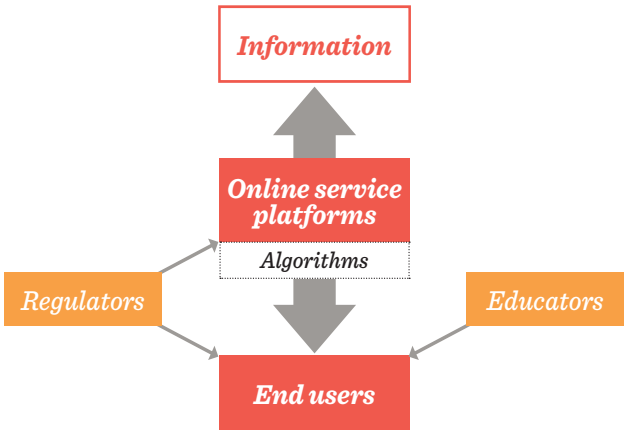


**Fig. 7.** ***The actors at whom the ethical code is targeted***

The following ethical code is built on and aims at extending the advice of Pariser (2011) and Krotoski (2011). It is targeted at the four mentioned stakeholder groups.

## 5.3. Ethical Personalisation Code

We think pursuing the following advice targeted to the end-users, online service platforms, regulators and educators will help in reaching a fairer, clearer, more trustworthy and more transparent information personalisation environment than the one we are living in today.

**Table 1.** ***Ethical Personalisation Code.***

| **Stakeholder group** | **Do's** | **Don'ts** |
|---|---|---|
| End-users | + Be literate: Understanding the basics of coding and algorithms is and will be indispensable.<br>+ Be critical: acknowledge the agendas of the services you are using and the bias of the information sources.<br>+ Be active in drawing your view of the world. You have more responsibility, as all information can be filtered and personalised.<br>+ Claim fairness: Use only services that have an ethical certificate/are widely recognised as ethical; services which have terms and conditions that are understood easily and quickly and are not changed repeatedly; services which are explicit in their agenda and which allow you to easily manage the filters and preferences.<br>+ Remember the power you have: Online service platforms cannot do without their users.<br>+ Cherish serendipity and diversity: Show active interest in multiple topics and viewpoints. Even exaggerate! Be unpredictable in your online behaviour so that your profiles become more multidimensional and dynamic.<br>+ Be active: review and update your settings monthly; take advantage of the information filtering.<br>+ Remember your responsibility: show respect to your peers in your online activities/ behaviour. | – Don't be naive: Don't assume there are free lunches. If the service if free for you, you are the product and your data is the developer's currency. Don't think there is no agenda in the filtering.<br>– Don't be unrealistic: understand that algorithms are not humans, but mathematical approximations the results of which are based on data about you and your actions. Their abstractions seem perfect on paper, but, once applied in the real world, they are hardly ever correct.<br>– Don't misuse algorithms yourself, either: don't utilise them for inappropriate, illegal or criminal purposes. |
| Educators | + Study the services and their terms and conditions.<br>+ Teach the principles of the services and their terms and conditions.<br>+ Provide alternatives for mass services if you consider them unethical.<br>+ Demonstrate the best- and worst-case scenarios.<br>+ Raise awareness and teach the possibilities for modifying and controlling your data and information filters.<br>+ Differentiate the rules of the physical and the virtual world.<br>+ Take into account that kids use the Internet from a very early age.<br>+ Highlight carrots, not sticks: punishments may yield negative influences. | – Don't assume everyone is as educated.<br>– Don't assume youngsters know the drawbacks.<br>– Don't underestimate the power of spending time with the gadgets online.<br>– Don't underestimate the pace of development.<br>– Don't underestimate the creativity of the illegal actors and online criminals.<br>– Don't preach but rather give inspiring examples of how the Internet can play a big role in making the world a better place. |

| | | |
|---|---|---|
| Regulators | + Always refresh your knowledge.<br>+ Collaborate internationally.<br>+ Set common global rules for common global digital operations.<br>+ Emphasise the role of awareness in utilizing services.<br>+ Be certain of the security issues when it comes to privacy.<br>+ Raise awareness of the possible drawbacks of the systems.<br>+ Allow educators to teach the rules of the places where most students spend a large part of their time.<br>+ Force companies to be transparent in their agendas and processes.<br>+ Build a valid alternative through collaboration and supporting multiple smaller players.<br>+ Think about the best- and worst-case scenarios.<br>+ Be open and adjustable to future changes.<br>+ Encourage start-ups to create novel ethical online services through funding (Tekes, EU funding etc.) and other reward mechanisms.<br>+ Create a tax deduction protocol for ethical players.<br>+ Encourage and support civil activity in both putting pressure on online service platforms to make them operate in a more ethical way; give support and credit to those who foster ethics. | – Don't allow one player to become too dominant, but encourage collaboration among multiple stakeholders.<br>– Don't neglect the sensitivity of information, for example, emotions are not to be used for commercial purposes without the end-users knowing it.<br>– Don't spend time and resources on copyright protection that does not work.<br>– Don't concentrate too much on illegal business models (e.g., Cryptolocker); rather, shed light on creative examples from the more ethical business context.<br>– Don't underestimate the effects of illegal operators and their futuristic visions. |

| | | |
|---|---|---|
| Online service platforms | + Visualise: a clear visualisation of what information an individual is sharing, what the information filtered is based on, and the ability to switch off and adjust sharing and filters whenever wanted.<br>+ Meta-personalise: provide the ability for the end-users to decide on his or her personalisation ID at a peculiar time.<br>+ Serendipitise: integrate serendipity into the code and provide surprising, yet interesting hits for the end-user.<br>+ Emotionalise: integrate emotions in the code to serve the end-user more precisely.<br>+ Prioritise ethics: the service has to be ethical, fair and unproblematic by default.<br>+ Give power to the user: open your algorithm, allow the active and competent users to edit the preferences and algorithm, e.g., to choose which variables they want to be used in the filtering.<br>+ Need vs. want: try to provide the end-user information important for their personal growth (e.g., not what they assumedly want but also what they need).<br>+ Balance and differentiate among entertainment, advertising and factual information.<br>+ Consider the power of the impact of your code.<br>+ Educate the users and raise awareness of the drawbacks.<br>+ Be transparent and honest.<br>+ Consider the person a person.<br>+ Provide opportunities to be involved without providing personal information.<br>+ Understand the dynamic nature of human beings they are not static in their actions, opinions or emotions.<br>+ Be clear and explicit don't use vague expressions (like "third parties").<br>+ Use your power and coding skills to make the world a better place. | – Don't dream about being able to know the users: They are not a line of zeros and ones but dynamic creatures, human beings that act organically: they change their mind, values, opinions, and areas of interest.<br>– Don't imagine that you know them entirely. There are always things that have not come up yet. Build the algorithms so that they constantly test the user by offering results outside the known core of interests.<br>– Don't provide a junkie with a new pill, but offer him or her help instead.<br>– Don't assume everyone is as educated as you.<br>– Don't assume everybody knows how to modify their profiles and control their filters, but teach them instead.<br>– Don't underestimate the power of your algorithms.<br>– Don't use emotion for commercial purposes without the end-users knowing it.<br>– Don't provide the user's private data to third parties without the user's consent.<br>– Don't use your skills for criminal or shady purposes. |

To sum up the table, users are at the core of commercial online operations; they are the product that is sold to the advertisers by the online service platforms; they provide the data that the operations are based on. Controversially, they are the ones who should be considered to have the least education or knowledge on how the personalisation algorithms function. What we are calling for from the user side is awareness. To enable the awareness, we require related knowledge and education from both the educators and policy makers they won't be able to regulate nor educate if they don't understand the fundamentals of the systems. To enable the regulators to educate and understand, we require openness, from the side of the online service platforms.

# 6. Conclusions

Today, algorithms replace the human factor in gatekeeping. As more and more information is personalised based on increasingly precise data collected on the users, the level of awareness of the possible implications must be raised. Personalisation practices should be brought to open discussion. Users have to become aware of information filtering and its effects so that they can demand fair practices from the online service platforms – and choose not to use the unfair services. If fair and ethical services are asked for, the laws of supply and demand should ensure their availability. Not all users can be expected to have competence or interest to stand up for themselves. Therefore, ethicality has to be ensured by the whole ecosystem; the biggest responsibility lies naturally with the providers of the service platforms, but the pressure from the users is the most potential means to force the service platforms to act ethically. Educators can enable the empowerment of the end-users, and regulators can support the development of a fair digital environment by setting rules with which the end-users and the online service providers have to comply.

We claim that by following ethical principles, both the service platforms and their users gain benefits. From the developer side we call for transparent actions and a balance between relevance and serendipity. From the end-users, this requires proactivity and awareness. Educators and policy makers should take a larger role in proactively interpreting the implications of personalisation towards the users and actions of users towards the companies. The essence of building the principles lies in finding the balance between the users' interests and those of the companies.

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# *Scenarios*

# Junior's day at school in 2025

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## 1. *Quadrant*

The scenario proposed in this article is described in terms of two variables: teaching vs. coaching and standardized vs. personalized.

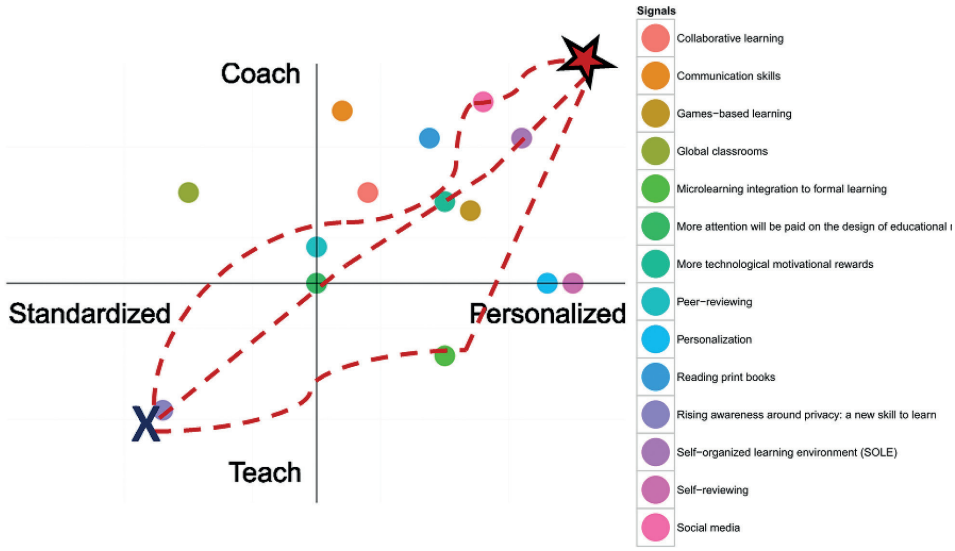


**Fig. 1:** ***Scenario Quadarant***

The current situation is placed in the bottom left side of the Fig. 1, where the traditional role of teachers as gatekeeper of knowledge and the standardized school curriculum are the main characters. The scenario is in the top right side of the graph. In this scenario teaching activity becomes coaching: teachers do not have their traditional role anymore; instead they become coaches of students in their learning strategies. In other words, they show the students how to deal with this digital world, how to keep their privacy and how to extract information in an efficient way. Moreover, the standardized curriculum is replaced by a personalized education, depending on the student's background, and enhanced by personal interests and abilities.

## 2. *Factors Encouraging This Scenario*

Factors driving toward this scenario are all the online communities involved in learning, ranging from Coursera and Khan Academy to the MOOCs as described in chapter 'How Will Digital Media Impact Education?'(see Section 2.2.). Personalization and coaching are the building blocks in these learning experiences. The evolution of these new ways of learning would change the barrier between formal and informal education, would change the role of teachers and would create a global environment for every student. This would lead to the predicted scenario. Many factors encouraging this scenario are the signals described below.

## 3. Factors Discouraging This Scenario

Factors discouraging this scenario are all the traditional practices and institutions that enhance the role of teachers as central figures in the learning development of the students and provide little flexibility of the curricula in terms of personalization. From this perspective, education is offered to the students, but not determined by them. The schooling system as conceived today is based on this idea. Therefore, the schooling system per se would not lead to our scenario.

## 4. Narrative

We shall illustrate this with a few lecture examples about a school day of a primary school student, called *Junior,* in 2025:

- Before leaving for the school, Junior checks the school wall to find out what is happening that day (what they had collaboratively decided to do in gym class that day).
- On the bus on the way to school, Junior watches a lecture video on his tablet and tweets his comments on the given assignment.
- The Biology class is a part of global curriculum and held together with a British class in an online classroom.
- In the History class students are recreating the Battle of Waterloo in a gaming environment; after the game everybody knows what happened in the battle and how Napoleon fell in 1815; they are rewarded according to performance.

All this learning will be stored in School-Cloud, and once the junior completes elementary school, this information together with his social graphs, shared feeds and blogs can be taken with him and used beyond the school context. The School-Cloud provides teachers with rich information about the strengths and weaknesses of the junior, helping to focus on the weak points and to fuel the strong points.

# Lucie's Tale

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## *1. Quadrant*

The graph has axes going from complex to comprehensible data and from mere awareness to action as ways to react to data about climate change. The scenario presented here is a preferred future where media shifts from one quadrant to another over the next fifteen years.

The media is now at the point 2014. The trends indicate it is moving towards the more comprehensible in 2020. We think that, with regard to the environmental values that we have presented in the article, "Transparent Media Driving Spaceship Earth", the point 2030 must move more towards action. Technology gives an opportunity for more transparency, more awareness and, ultimately, action, and media needs to take that opportunity.


## 2. Narrative

### 2.1. 2014

Lucie went pale reading the sentence for the second time after the email caught her attention. But she wasn't thinking of all the lost hours that went into tracking down the missing datasets or even how she was going to make ends meet now. She was thinking of her sources. The people that she had convinced throughout the last half year to risk their careers and quiet lives to give up the information she needed from inside the companies. And all because senior management led her on!

It was clear now; there was no chance in hell this report was going to be released in the first place. But who would've known? When they told her that there was no story. That the human element was missing. That she needed proof. What did she do? Got the story, got the human element, got the proof. Some people would call that stubborn, but it was her enthusiasm that was driving her to forward.

She thought about how this was only supposed to be a half-year gig, to get her over her constant financial problems until she would finish her PhD in Information Science. Back then she never would've imagined that this job would become so important to her. To the point where she felt personally offended when the entire company was being officially slammed for biased reporting on climate change.

Heads started rolling in her department, but in her view the problem was systemic. If a reporter has only two hours to write a compelling report on climate change, how

good can it be? And solid data about carbon emissions is incredibly hard to come by, since it's probably nothing that companies are specifically proud of.

But there's nothing that a little bit of data wizardry couldn't help. She started linking and cross-referencing existing data sets and was able to create a quite realistic estimate of the biggest polluters out there, plus the politicians who were directly linked with those companies. The results were eye opening.

"Publishing postponed indefinitely for now. Nothing I can do…. Sorry, Max."

She broke her gaze that had been lingering on this sentence and realized that her breath was calm and her mind was blank. There was nothing for her to do here anymore. She started packing her things.

## 2.2. 2020

"Look, Max, I really need your help to get senior management to be our media partner at the hackathon. Or at least a sponsor. I mean we have amazing people participating, check this out...." Lucie showed him some slides on her tablet as she pushed her chair closer. "This app lets you see a digital reconstruction of your surroundings from 100 years ago or more; it uses scientific data from the universities we're working with. And you will like this one; it's citizen journalism where nature enthusiasts can put their geotagged wildlife photos online and the app tracks migratory movements. You can already see how species are moving north because of climate change. Oh, and this one is highly relevant, predicting malaria and dengue fever rates in Europe up to twenty years into the future."

"I don't know, Lucie. This all sounds very nice, but the news agency is in real trouble now. Senior Management is trying hard to expand to new areas, get new revenue." "Well, just show them this one; this is from last year, it's a strategy game where players have to build defence walls against floods, and the sea level rise. It's based on real-world data. Political scientists are even looking into the best player's strategies now as inspiration for their expert opinions." Max took the tablet from her hands and started flipping through some slides.

"I really feel bad asking you for this after all you did for me to try to push the report through. But I've been teaching data science to journalists for the last five years now, and it feels like a drop in the ocean. News is still a mess, nobody cares for facts, and they're just quoting politician's opinions. I'm desperate, Max. I've even continued working on the report again, and it's like seeing it with brand new eyes. The data has given me a ton of new leads for potential stories, but I need their infrastructure, I need their brand to publish! Max, I really want to be a journalist again."

"Yeah, I've heard about your little data-leaking platform. Have you gotten any legal problems yet?" Max said while sipping his coffee and looking straight into her eyes. Lucie glanced around nervously, biting her lip. "How did you...? Who told you…?" A little smirk appeared on his face. "You just did."

Lucie was resting her head in defeat on the couch table in the middle of in her cluttered living room. Her hand was holding a rolled up e-paper, which she was slapping repeatedly against the back of her head. The article header read: "Climate change activist suspected as lead in carbon data disclosure site." Amina stopped pacing around and grabbed the e-paper from her hands and said, "Fuck! Why did you tell this prick? The beta wasn't even public yet." "I told you, it was an accident. He tricked me." Amina sat next to her on the table and tugged her shoulder saying, "That's it, we need to go public."

"No way" said Lucie and got up quickly. "We can't; we don't have enough initial data yet to get it to work." "We have no choice; can't you see that they're starting a witch hunt? They feel the pressure and now they're coming for you. You can't get inside anymore. Your plan didn't work. He played you." "Oh, Max, I thought you were on my side," said Lucie. Amina took her by the shoulder and said, "Look, Lucie, everything that reaches the public regarding pollution is just empty phrases, there are no strong images, no culprits. The data is accessible, and the technology and enthusiasm are there, but the polluters are still profiting. We have to hit them closer to home."

"You mean we publish my report as well?" said Lucie. "Exactly, and the entire linked dataset exposing the media company's financial ties with the polluters. We need to push back before they completely discredit us, show the public why they are smearing you, and why they never got around to publishing your article." Amina opened her laptop and started typing. "Let's show them who they're dealing with."

## 2.3. 2030

It was a relatively sunny day, quite uncommon these days. Lucie was looking out the window of her train at where the East-London sea defence wall was being constructed. Quite a monument, she thought, the three-story houses paled in insignificance against the backdrop of the curved concrete wall. She stepped off the train as soon as it reached the station.

She felt uneasy returning from a three-week scouting trip in Western-Australia. People there were desperate; the political situation had become hostile ever since most of the larger cities there have been made almost uninhabitable by constant flooding. She entered her office building; the wall next to the lobby was a range of interactive demos of their NGO's journalistic tools. She took a detour to avoid any attention, taking the freight elevator to her office. She just needed to think.

When Lucie entered the office, she saw that Amina was already there, waiting for her. Amina gave her a prolonged hug and said, "I'm happy that you're back. But now back to business. We have three reports to publish as soon as possible, and we need you to solve some issues in the code. And the Demo starts in fifteen minutes." "All right," said Lucie. "Let me just grab a bite and I'll be there for you."

Amina was syncing her AR contact lenses when Lucie entered the room. The onlookers gathered there didn't seem to notice her enter, so she took a seat in the back.

"This works with any device," Amina said to the small crowd. "It is as simple as possible; you can try it yourself with your own gear. Just aim at a random product; take something you brought along, for example, and the app will show a nice visualization of the amount of water that was wasted, for example. You can also share particularly polluting products with your social network as part of the tagging game."

"Or you can simply switch to a number that shows you how much it will impact your environmental influence index. And if you switch to investigative mode, you have a range of journalistic tools available that will make it easy to collect, verify, link and contextualize any type of information. And anything you discover will be instantly integrated into our investigative news portal and made available for everyone else. More journalists, more data, better results."

Lucie started reading about one of the big polluting companies being smashed after the algorithms started detecting irregularities in their carbon reporting data. She thought about Australia. Yes, people were outraged. But their attention was elsewhere. Everybody was focused on the sea defence walls, the preparation of what was to come in the next ten years. $CO_2$ turnover rate is roughly 500 years. She was really hoping that people would come up with a way to clean up the atmosphere sooner than that.

# My Smartwear and My Context (The Smartwear Life of Mr. M)

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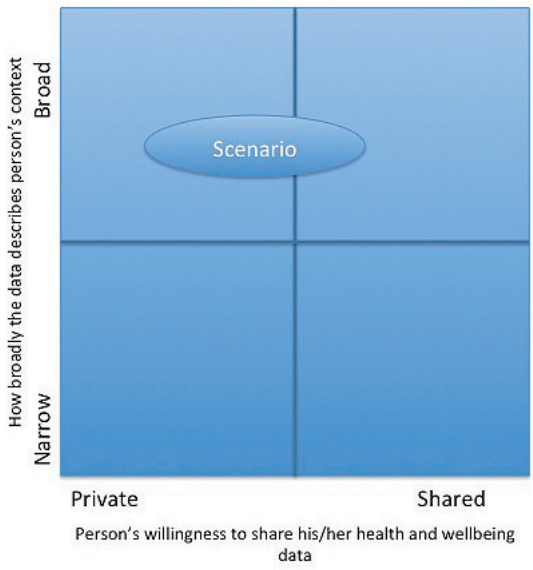
## 1. *Quadrant*

This scenario is based on the variables 'private vs. shared' data and 'narrow vs. broad' context regarding personal data about our health, wellbeing, feelings and context. In our scenario we tend to keep our personal information private, but we collect it from many different smartwear sources which we carry with us.

In the horizontal dimensions ranging between private and shared data, we would aim to have full control of available data. Along the left private side, individuals have achieved full control of their personal data and are able to manage their data and contents derived from it, albeit complex at the time of writing the scenario. Along the extreme right side that is the fully shared dimension, people's personal data is allowed as shared per default. That would mean a situation like a privacy-free zone where no privacy exists at all. Anyone can have access to anyone's data.

Vertical dimensions depict the amount and variety of the data. The extreme dimension of 'broad' indicates that the smartwear are fully contextually aware and able to interact, for instance, with other people's smatrwear, animals, objects and other location-based sensors. The 'narrow' end on this dimension (bottom of diagram) is the opposite: only the minimal amount of data is collected and used.




## 2. *Factors Driving Towards This Scenario*

**Technological** development is developing wearable devices, clothes and other gadgets on ever increasing pace. We predict that smartphones and wearables will merge into smartwear which are hands-free, always-on, environment-aware, connected, attention-getting and which provide a platform for multipurpose apps.

Smartwear will collect and use data to empower people to take more responsibility for their own health and wellbeing. People are driven by curiosity. Smartwear can help to improve the productivity of doctors and nurses in hospitals by providing access to critical data while they are in an operating room or on the way to the hospital. Smartwear can help elderly people communicate with family members, track their location, activity, vital signs and call for help in emergency cases. Smartwear can help the elderly live longer in their own homes.

**Societally** speaking, smartwear can help in keeping up with the increasing demand for health services and rising costs in providing care. Smartwear can help the move from disease management to disease prevention, to keep people out of hospital. This will transform healthcare structures and societal systems profoundly. Countries embracing this new productivity potential will gain economically.

## 3. Factors Discouraging This Scenario

Privacy and security issues recently have caught the attention of large audiences and regulators. People have become conscious of the risks involved in sharing their personal data too openly. Public data about health-related problems can have a severe impact in people's future possibilities, for example, in being selected for a job or promoted to a new position. Such changes in societal acceptance are nowhere trivial alongside new senses being captured via the smartwear.

New **business** models for collecting and using personal health-related data are not yet solved. It is still unclear whether they will be funded by advertisements, by subscriptions, by pay-for-service or through public funding. Moreover, **legal** issues over the ownership of these massive data streams need to be settled, and this may result in **political** debates due to sensitivity between data protection and ubiquitous connectivity of data. Who owns the data collected to the cloud servers, and who pays for the storage and use of that data? Or will the smartwear and data analysis be bundled with a wider service package like a senior home monthly fee?

**Technological** challenges, including interoperability, power use and data storage, may turn out to be unsolvable. Smartwear will also raise difficult environmental issues. The servers in the cloud will become more energy-hungry and demand new power plants to be built. The electronic devices in smartwear cause new waste management and recycling challenges. Even worse, can the electromagnetic fields of smartwear cause new types of health issues to the people wearing them?

## 4. Narrative

In Finland the reform in Social and Health (SoTe) has been completed and the ongoing health and wellbeing initiatives have been able to join forces. 'My health data repository' (Taltioni) gives citizens the platform to collect their personal health and wellbeing data and share it in full control to the service providers they trust. 'Public sector health archive' (Kanta) collects medical records of every citizen to be used and shared by healthcare organizations and also provides citizens access to their own data. Biobanks (in Turku Auria biobank) collect and maintain samples, such as tissue and blood samples and related medical data of citizens to promote health and research. Electronic medication prescriptions (Kela) are used instead of paper-based prescriptions and also give citizens access to their own medication history. Clinical decision support EBMeDS (Evidence-Based Medicine electronic Decision Support) by Duodecim, which started development in early 2000 and was in production with more than 30 000 guidelines in 2014, has now been extended to also cover smartwear and personal health and wellbeing. Smartwear providers and platform providers have developed and agreed on interoperability and open interfaces among smartwear, platforms, medical records and personal health records. Business models have been

developed. Those citizens who can afford it will take more responsibility for the costs related in keeping up their health, and public funding is provided to those in need. The emphasis is in the move to keep people out of hospitals and move closer to a preventative care model.

**The Beginning of a Smart Day for the Family of Mr. M in 2026**

Here we set up a story about a family living their everyday life equipped with smartwear in the year 2026. The Health and Wellbeing Information System (HWIS) based on their physical data collected through the smartwear devices forms an invisible secure network around them. Their daily geolocations, the alimentations that maintain their bodies, their daily-life movements, are all sensed, datarized, quantified, monitored, and advised by this system, which coordinates their living resource and service suppliers supermarket, office, health centre, school, gym, home, car, etc. As the system is designed simply to provide advice and the data transmitted is secure and sharable only fragmentarily according to need, any adult can take control to turn off or on certain sensing options according to preferences, except those vital signs obliged to be sent by law and regulation related to the social security system managed by government.

**Persona**: M, male, age 40, engineer; N, female, M's wife, age 37, hairdresser; T, male, M's son, age 9, 3rd grader; W, male, M's father, age 79, retired

A calm and quiet snowy winter morning, starts with the gentle ringtone of the alarm set next to Mr. M's bed. The rhythm and volume was lowered this day, according to M's recent condition stressed by overloaded office work, that has shown physical signs such as heartbeat, blood pressure, and muscle tightness detected by the HWIS. However, on the other side of the bed and in the next room, N and T hear the alarm differently, for they need a rocky waking-up call to start their somewhat monotonous daily routines. One by one, M's family arise freshly at a time that is set by each one's best sleep cycle detected by their smartwear.

The first thing for M is to go to the gym. To maintain good health he built one in the basement when moving in, all according to suggestions provided by the HWIS. Every morning, each family member receives recommended exercises through his or her smartwear. M needs to do more jogging lately, N continues her ashtanga yoga, and T sometimes join them to practice his martial art, but only when he feels like giggling around his parents because at his age he gets enough sport and exercise in school. The morning exercises really freshen them up and bring them good appetites for breakfast.

In the kitchen, N makes warm rice porridge and fries bacon to go with the scrambled eggs and green onion. Everyone gets his or her personal nutritions added according to the recommendations of HWIS. Soya milk, sliced apple and carrot, and nuts are to go afterwards. She knows this is the best combination at the moment for

the family according to the analytics shown on her smartwatch when she did grocery shopping yesterday in the chain supermarket just around the corner. The food supply industry joined the HWIS a few years ago to provide more food varieties according to the information analysed by the HWIS based on data collected through smartwear from the neighborhood. It also sends recommended recipes based on locally available supplies to the screen on the door of N's refrigerator in the kitchen, according to N's shopping list.

She adores the smartwatch that M gave her as a birthday present last year. A light, soft, durable texture with a thin bendable screen 5x5 cm width or enlarged to suitable surfaces around her that she can touch control with her fingertips to get info about nutrition, physical condition, near-location info such as weather, air quality, relaxation activities provided, exercises suggested for the whole family, including M's father, W, who lives alone thirty kilometers away in another town after retirement four years ago. In fact W was able to prolong his working life because of his superb physical condition guarded by the HWIS.

The system successfully prevents the potential development of heart diseases that may be enacted by the gene pool on his father's side of the family. Smartware on W's body controls his medication based on the personalized clinical decision support services of HWIS. Now W still contributes his time and energy to teach Haitian kids who lost their parents in a natural disaster, through the global e-learning system built up by UNESCO in the 2020s. He is very motivated, as nothing is more rewarding than seeing those smiling faces of young children, especially when he told them he actually has seen the now extinct polar bear and other animals when he was a boy. Yes, he truly wishes his grandson T could join the e-learning system, too.

Sitting next to M, T grabs the last slice of apple from the plate and puts it in his mouth. He is very interested in the news broadcast through M's glasses. He can hear the reporter's voice and, if M wants, he can also see the images projected from the tiny button in the middle of the glasses to the wall in front of M. But M wants T to concentrate on the screening of plant Mars (shown on his own wristwear, similar to N's, but the foldable screen can be opened to size 5x10cm), a learning topic this week coached by his subject teacher in school. He has his own learning program as he is enthusiastic about Astronomy. His best friend gets into Sea Life this week. M is fascinated by the puffer fish and is thinking about choosing that topic for next week.

When the tick-tock of the wall clock in their dining room reaches 8:00 am, the car in the garage is set to tune up the temperature, humidity and air. Their Tesla car knows that in about fifteen minutes the whole family will get in and start their journeys of the day together. The travel routes are programmed according to each family member's schedule, as M and N want to have family gathering time as much as possible. Thus they maximize their time together, even during daily transportation. M is extremely satisfied with this new car that can be programmed to not only provide the best route and indoor temperature, but also the best energy utilisation, seat condition for each passenger, and entertainment programs as well. And with a

smile on his face, M holds the steering wheel; another bright day in Mr. M's life in 2026 thus unfolds….

# Two Views from Inside the Bubble

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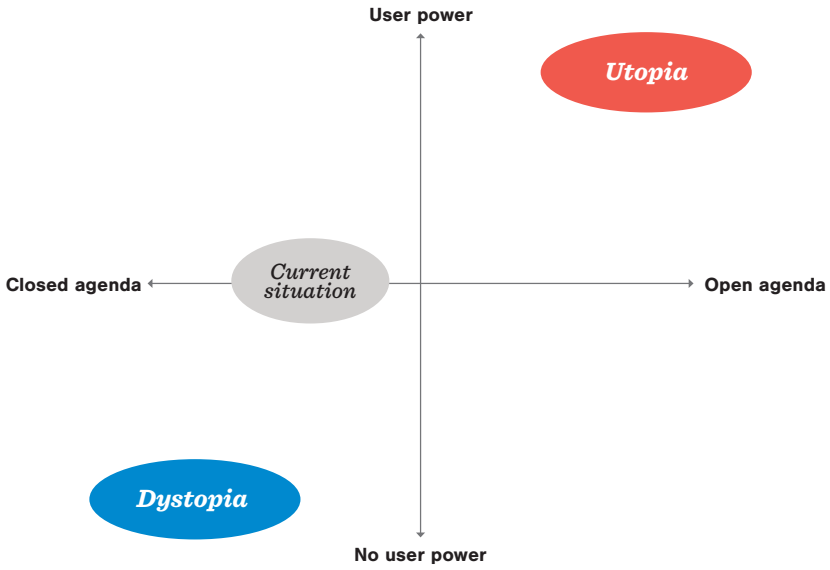
## 1. *Quadrant*

We have examined the ethics and implications of personalised information filtering in 2025. The main variables on which our scenarios and our vision of the future are built are the following:

- **User power** vs. **no user power**: What will the end-users' role be in the future? How much power will they have? At the negative extreme, the service providers or perhaps even a government has all the power.

- **Open agenda** vs. **closed agenda**: How openly do the service providers function? Are they collecting user data without users knowing it and using it for their own benefit, and is it unclear to the users that content is filtered? Or can users choose how their data is used and how the content they are offered is filtered – or is it at all?




When discussing the current situation, we all agreed that the service providers' agenda is more closed than open: we do not know that much about what they are doing behind the curtains, and there are many people who do not even know that Google search results are not the same for everyone. There was, however, some disagreement related to the variable of *user power.* Some saw that users do have some power; some saw that they did not have much power.

## 2. Driving Forces Supporting and Preventing the Scenarios

As we created the future scenarios, we drew the landscape on four assumptions related to four megatrends: technology, economics, environment, and politics.

- Regarding technology, we assume that the technology development will continue at an increasing pace (e.g., Schimdt and Cohen, 2013, 5): *"… computers in 2025 are 64 times faster than 2013; data coming out of fibre-optic cables roughly doubles each 9 months."*)
- Regarding global economics, we assume that the economic growth will stall in the developed Western countries, and the developing Eastern countries will take the lead.

- Regarding the environment, global warming is continuing, natural disasters will increase and worries about the nature will increase, but incentives for radical changes in human actions do not yet exist.
- Politically speaking, tension between countries increases because of the Cold War that started with the Second Crimean War, but the tension between citizens is in decline because of information availability. Because of the political tension, there is, however, an ongoing discussion about setting national borders on the Internet.

### 2.1. Forces Driving Towards Utopia

People's awareness about the use of data has increased in the recent years with news reports about the misuse of data and even feature films about data use (such as *Terms and Conditions May Apply*). People have started to demand companies to act more ethically in regards to using conflict minerals, environment, working conditions and privacy. In time, ethicality and openness can become a strong competitive advantage even for companies such as Facebook and Google. Thus, access and power over their personal filtering algorithms could be a requirement for people to accept a service. Knowing exactly why the information is filtered as it is creates a trust between the end-user and the company so that the explicit advertising can in fact be more powerful.

### 2.2. Forces Driving Towards Dystopia

The current trend in the use of private data suggests that ethics does not play a large role in the companies' strategy. During the early twenty-first century, people have gotten used to "free" services, such as Facebook and Google. The companies can provide the service for free to the end-user because the users' data and the access to the users are more valuable than providing the service. This creates a sort of gridlock where people are unwilling to pay for services, so the companies have few options but to continue exploiting the user data. Taking the exploitation a step further and harnessing the power of filtering for commercial and political agenda is very tempting from a financial viewpoint. As users' awareness of the true agenda driving the personalisation could encourage them to use a competing service, it is probable that the companies will attempt to hide the commercialisation of filtering from the end-user.

## 3. Narratives

Predicting technical development, its consequences and which advantages or disadvantages for the end-user will dominate in ten years is very uncertain. Many players, forces and counterforce from innovators to regulators with contradicting interests are involved, and rare and unpredictable events often have an extreme impact on the

world, as Nassim Taleb (2007) has noted. Therefore, to map the possible progressions, we present two alternative scenarios: one utopian and one dystopian.

Based on our assumptions, we tell the same story from the utopian and the dystopian views in an attempt to highlight the main issues personalisation as it is evolving today may imply. Our main character is a single, male doctoral student who is utilising context-aware services.

### 3.1. Utopian Narrative

*"After you have watched this next news clip, you should consider moving back to work"*, Mika's digital personal assistant, DPA, gently advised him as the lunch break was about to end. He had rested enough, his blood count showed a good energy level, and, based on his micro expressions, DPA could see that his emotional status was quite relaxed and focused. Therefore, DPA told him to get straight down to preparing the content of a video presentation he was supposed to have ready in a week.

The topic of the presentation was the origin of the tomato virus that nearly destroyed all European tomato production in 2022. The DPA had already searched for background material for Mika using different profiles. Naturally, this included Mika's work profile and his personal profile in myidentities.org, but DPA also explored several imaginary profiles from a European businessperson to an Asian environment activist to get variety in the results.

Mika examined the 360° visualisation of the articles that had come up: Obviously, there were many that tried to diminish the whole phenomenon; these were mainly provided by EU organisations or European companies. In counterbalance, there were many that blamed the EU for disregarding the risks related to the cloning of genetically risky seedlings; the cloning was shown as one more sign of Europe's despair as it tried to fight back South America, Asia and Africa, which had taken the lead in the economic growth. If Mika had just made a plain Google search with his personal profile, he would have received results mainly of this latter kind, as he was a member of several environmental organisations and his political thinking could be best described as 'critical'. The topic had also been approached by some Russophobes who traced the problem to the crisis of Ukraine that started in 2014. They were arguing that the Russians created the virus and spread it on purpose.

As a microbiologist Mika was focusing on the morphology of the virus. His attention was caught by an Argentinean NGO's report claiming that the high error rate in replicating the virus and the type of antigenic drift would indicate that the virus had its origins in the laboratories of a Swiss pharmaceutical factory. Was this just a groundless hoax, or could it have some truth in it? Why hadn't this viewpoint been discussed elsewhere? Mika asked the DPA to adjust the search algorithm slightly – he suspected that despite his previous adjustments, the algorithm was still emphasising collaborative filtering too much and not always supporting serendipity enough. Indeed, some interesting results started to appear, and Mika was soon immersed in the articles.

The DPA had detected that Mika was working enthusiastically, in a flow mode, and did not interrupt him until the last minute: *"Dear Mika, it is now time to leave for your date, but I have a car waiting for you downstairs, so you can continue working on the way."* A little reluctantly Mika dictated the last sentences to the computer and started to prepare to leave, his mind still working on the new information on the virus. At the same time he started to get excited about the date. Lars seemed so nice! According to 5starmatch.com, they were a spectacular match – 98 per cent! Recently they had had conversations in fully immersive virtual-reality every evening for hours without noticing the passing of time. Now it was the first time to meet in real life.

The dating service 5starmatch.com draws data from myidentities.org, but only according to the wishes of the user. Mika had allowed it to take all data from his leisure and professional profiles because this would provide the most comprehensive image of him. In addition, he had listed in 5starmatch.com the hobbies he would hope his dates to practice or favour: he wished to be able to go skiing with his future partner, and, as he owned a dog, he should also like animals (luckily allergies weren't an issue anymore, thanks to the advances in gene therapy). However, Mika had opted not to have hereditary compatibility taken into account – he was a true romantic.

5starmatch.com had suggested that they could order food from an Indonesian vegan restaurant they both regularly used and liked, which would have been a guaranteed but boring option. Instead, they had decided to opt for serendipity and try a new Spanish restaurant, even with the risk of not liking the food that much. It was so rare to find traditional European cuisine and other than vegetarian food in Helsinki nowadays.

As the self-driving car was approaching the restaurant, the DPA briefed Mika about Lars's recent activities online, activities that he would benefit being aware of: Lars had been showing his support for the law against combustion engine vehicles, and he had shared a 3D holograph video of his nephew learning to bike. Based on his feed, Lars also seemed to have close connections to the Finnish company that had created the successful identity management service myidentities.org. Mika decided to ask Lars more about this. Could he have been involved in the start-up? Lars had studied at Aalto University back then, so it was possible.

Before entering the restaurant, Mika switched off his DPA – even at the risk that the DPA could be of big help in case uncomfortable silences appeared, as it could give advice on topics to discuss and even whether or not to choose the meal that would perfectly fit his taste and his nutritive needs. Instead, he wanted to be totally present and focused and was very glad to see that Lars had decided to do the same.

As they toasted with organic white wine produced in Åland, Mika felt happy – his life was good, he felt it was only getting better, and he felt he had the right amount of control over it. It did not take long; after only six months of intensive dating, Mika and Lars were deeply in love and wanted to settle down and have a big family. Thus, through 5starmatch.com, they started to look for a suitable and fit surrogate mother who would deliver their twins. The couple utilised a novel technical feature in their

DPA that tracks the genes and potential recessive illnesses from fingertips through mobile screen. Since Lars was healthier and since his grandmother was one of the first female composers who had been recognised, they wanted to utilise his genes in order to be parents to babies who were intelligent, emotionally sensitive and creative. They soon met Martha, who was a poor artist willing to contribute in order to fund her painting career for the next five years. Martha had just received an invitation from the famous Kukkenheim Gallery in Italy to have an exhibition. After eight long months, healthy baby boys were born, and Martha, Mika, and Lars met in the hospital. Mika and Lars had never felt happier; now they were getting married and renovating a room for the babies, Mika Junior and Lars Junior, in their newly built house. Martha was exhausted but also very happy, because she felt good after delivering the babies to a loving family and being able to concentrate on her painting again.

### 3.2. Dystopian Narrative

"Not OK, Glass! I told you already, I don't want to have a third cup of Starbucks Reserve® Sumatra Blue Batak coffee."

"But Dear Mika, like I told you already, your blood caffeine level is still far from optimal and Starbucks Reserve® Sumatra Blue Batak is a 97 per cent match with your taste profile. I really think you should have another cup. There, I already sent the order to the coffee machine."

"And charged it to my PayPal account again without my approval? I really need to find someone who knows how to reprogram you."

"No reason to get upset now, Dear Mika. In fact, I think you should get back to work; the coffee break is over."

Writing a short article on the origin of the Italian tomato virus of 2022 had proven to be easier than Mika had anticipated. He supported the theory that the virus that destroyed Italy's tomato crops had originated in Russia. It seemed like Glass could find the exact information he was looking for even before he was looking for it and add it the article. It was not fair to say that Mika was writing the paper. He merely steered the paper in the direction he wanted to, changed the structure here and there, and added some personal touches to make the article "his". While reading the paper again, Mika noticed a contradiction in the third paragraph. The number of contradictions had increased in the past couple of years that he had used Glass to write his articles.

"Glass, why did we first write that there is a debate in the scientific community about the source of the virus, but now it says that scientists agree that the virus originated in Russia?"

"Dear Mika, according to my sources, both are true, but the latter is truer than the former. Here are the relevant search results for you."

Mika skimmed through the articles Glass had selected for him and it seemed that the top search results supported his own view. After a few more searches, Mika was

convinced; indeed, the virus must have originated in Russia. He could have sworn that some scientist had written a paper that implicated Kraft Foods as the creator of the virus, but he could not seem to find it anymore. Glass continued to edit Mika's article in the background as Mika searched for more articles. At the end of the day, the title of the article had changed from "Italian virus originated in Russia?" into "Russia created the Italian virus – Kraft Foods developed the antidote."

Mika was quite happy about the way that the article had turned out and excited because Glass had found a perfect date for him for the evening. After searching for a restaurant for the date, Mika had decided on a restaurant that was a 99 per cent match with his date's preferences and a 94 per cent match with his own, according to Glass. After all, both of them had been eating only Chinese food for the past two years, so obviously they did not want to eat anything else. The restaurant was ten blocks from Mika's apartment, and he had decided to walk there since the weather was nice. However, Glass had already ordered and paid an Uber taxi for him.

"Dear Mika, I am sure you do not want to walk there. You never walk anywhere! You could be late and sweaty if you walk, but when you take Uber taxi, you will be on time and fresh!"

Entering the restaurant, Mika saw a red beacon over a girl sitting alone at the corner table. A flood of instructions filled his view, starting with opening lines that would get the most positive response from the girl based on her profile. Halfway through the date, they both looked happy and thoroughly in love, as their Glasses told them line by line what to say and when to smile to maximise the positive emotional response of each other.

Meanwhile, deep in the Glass Bunker, the secret Eugenics Department adjusted citizens' Glass-dating algorithms based on the needs of governments and companies who could afford the service for gene-development purposes. After seven months, Mika was deeply in love with Beatrice and asked Glass to provide lines to propose to her. They were again in that same restaurant where they first met. All of the sudden lights went off, Glass was broken due to an electric shock and was not able to make any more suggestions. Mika did not have a clue what to say. Mika proposed to her with his own clumsy lines and gave her a ring. Beatrice had waited for this moment for so long and she went nuts because things did not go her way this time; Mika's words and behaviour did not reflect the usual high poetic standards of Glass. She was now pregnant, and their baby was due within a few months. So it was too late to back off now. Besides, Mika and Beatrice had signed a contract with GeneCorp and thus had been able to choose the gender, eye colour, body structure and personality of their baby beforehand. The couple had also promised to make at least three more gene-optimised babies and always be available for further experimentation. Little did they know that the experiments were aimed at cultivating future babies into super consumers who would be able to use the Internet and make online purchases with their parents' credit cards before they can even talk.

## References

Schimdt, E., and Cohen, J.: The New Digital Age – Reshaping the Future of People, Nations and Business. John Murray, London (2013)
Taleb, N.: The Black Swan – The Impact of the Highly Improbable. Penguin, London (2007)

# *Appendices*

# 1. The Bit Bang People

## FACILITATORS

**ORMALA, ERKKI** – Professor at the Department of Management and International Business. He has a PhD in in Engineering from Helsinki University of Technology. He is a former Vice President of Nokia Corp. Ormala has chaired the assessment of the EU R&D Framework Program and the association of the European Digital Industry, DIGITALEUROPE. He is a member of a European Commission initiated high level advisory board on the future of the European media.

**NEUVO, YRJÖ** – Research Programme Director. He has a PhD in Electrical Engineering from Cornell University. He is a former CTO of Nokia Corp. He has worked as a National Research Professor at Academy of Finland and a visiting professor at University of California, Santa Barbara.

**KUIKKA, MERI** – Social media researcher, doctoral candidate in Information Systems Science. MSc (Information Service Management) and BSc (Business Technology) from Aalto School of Business. Current research topics include social media strategy for organizational use and challenges related to social media use in organizations.

## TUTORS

**HU, ZHONGLIANG (ROSS)** – A PhD candidate at the at the Department of Automation and Systems Technology, Aalto ELEC. His research interest is mobile sensor network and multi-robotics systems for environment monitoring applications. Originally from China, he also has studied in Germany and Sweden as an Erasmus Mundus scholarship student. He is currently working as a project/product manager in a Finnish embedded system design company and enjoys badminton, swimming and travelling in his spare time.

**JIN, HELENA** – A PhD candidate at the Department of Industrial Engineering and Management, Aalto SCI. She received her M. Sc. in Marketing from University of Helsinki. She has worked with consulting and forest industry companies. Her current research topic is innovations in dynamic industrial supply-demand networks. Other interests include swimming, basketball and yoga.

**KALLENBACH, JAN** – A PhD candidate at the Department of Media Technology, Aalto SCI. He received his M. Sc. in Media Technology from Ilmenau University of Technology, Germany, in 2004. His research about media experience crosses theories and methods from media psychology and communication science with approaches from behavioural economics and human-computer interaction. In particular, he focuses on the emotional, cognitive, and behavioural responses of users during their selection of and interaction with contents available in media products and services. His other interests are travelling, coding, and good food.

**KANTOLA, VESA** – Lecturer of audio-visual communication at the Department of Media Technology, Aalto SCI. He is a PhD candidate at the Department of Film, Television and Scenography, Aalto ARTS. His research interests are documentary film, user-centric design and interactive theatre & design-games.

## PARTICIPANTS

**AMMAD-UD-DIN, MUHAMMAD** – Pakistani, Erasmus Mundus Master's in Computational and Systems Biology. A PhD student at the Department of Information and Computer Sciences, Aalto SCI. Research topic: Statistical machine learning, bioinformatics and personalized medicine. Other interests: travelling, social grouping.

**ASATIANI, ALEKSANDRE** – Georgian, M. Sc. in Information and Service Management, Aalto BIZ. A PhD student at the Department of Information and Service Economy, Aalto BIZ. Research topic: Impact of cloud-based enterprise information systems on organization. Other interests: Long distance running, graphic design, hi-tech.

**BADHAM, MARK** – Australian, M. A. (Public Relations). A PhD student at the Department of Communication, Aalto BIZ. Research topic: Media management, media-corporate communications symbiotic relationship. Other interests: travel, reading (media consumption), great coffee (caffeine consumption).

**DEL CARPIO VEGA, LUIS FELIPE** – Peruvian, M. Sc. (Tech) in Communications Engineering. A PhD student at the Department of Communications and Networking, Aalto ELEC. Research topic: Wireless access design for beyond 4G systems. Other interests: business, cultures, track and field athletics.

**ELISCHKA, SYNES** – Austrian, M. A. A PhD student at the Department of Film, Scenography and Television, Aalto ARTS. Research topic: Audience engagement and the future of cinema. Other interests: media art, media technology, cooperation, snowboarding, DIY, circuit bending.

**HAKALA, JUSSI** – Finnish, M. Sc. A PhD student at the Department of Media Technology, Aalto SCI. Research topic: Naturalness of stereoscopic 3D images, binocular perception, stereoscopic 3D displays and cameras. Other interests: cycling, sci-fi, and growing chilies.

**ISLAM, HASAN** – Bangladeshi, M. Sc. in Computer Science. A PhD student at the Department of Computer Science and Engineering, Aalto SCI. Research topic: Information centric networking in challenged environments. Other interests: reading, cooking, playing games, swimming.

**ITÄLÄ, TIMO** – Finnish, M. Sc. A PhD student at the Department of Computer Science and Engineering, Aalto SCI. Research topic: Dynamic business framework for networks in health and wellbeing services. Other interests: country cottage fixing, jogging, photography, cycling.

**LEHTO, SATU** – Finnish, Lic. Sc. (Tech). A PhD student at the Department of Industrial Engineering and Management, Aalto SCI. Research topic: Individual differences in recall of visuals. Other interests: combining my PhD with the future of media.

**MIKKONEN, TOMI** – Finnish, M. Sc. (Econ) in Marketing, M. Sc. (Tech) in Telecommunications. A PhD student at the Department of Computer Science and Engineering, Aalto SCI. Research topic: Building information privacy as a part of service's DNA. Other interests: adventure racing, entrepreneurship, yoga, ropeing, traveling.

**MÖKKÖNEN, HARRI** – Finnish, M. Sc. (Tech). A PhD student at the Department of Applied Physics, Aalto SCI. Research topic: dynamics and rare events. Other interests: journalism, politics and economy, fictional literature, jazz.

**PERÄLÄ, RIITTA** – Finnish, M. A. A PhD student at the Department of Media, Aalto ARTS. Research topic: Audiences' engagement with media, especially with magazines. Other interests: sailing, vegetarian cooking, couchsurfing.

**PINJAMAA, NOORA** – Finnish, M. Sc. (Business) in Mobile and Electronic Commerce. A PhD student at the Department of Information and Service Management, Aalto BIZ. Research topic: Predicting digital revenue models in the publishing industry. Other interests: dancing, jogging, movies and yoga.

**RYTKÖNEN, EELIS** – Finnish, M. Sc. (International Design Business Management). A PhD student at the Department of Civil and Structural Engineering, Aalto ENG. Research topic: Dynamics of university campus management – orchestrating interdisciplinary spatial communities. Other interests: sports (swimming, surfing, snowboarding, hiking, climbing, yoga), culture (arts, design, drawing, phenomena, rock'n'roll) and travelling.

**SCEPANOVIC, SANJA** – Montenegrin, M. Sc. in Computer Science. A PhD student at the Department of Computer Science and Engineering, Aalto SCI. Research topic: Social network analysis / human social psychology, human dynamics. Other interests: space science and astronomy, dancing, reading poetry, travelling, cycling.

**SIHVONEN, SIRU** – Finnish. M. Sc. (Econ). A PhD student at the Department of Engineering Design and Production, Aalto ENG. Research topic: Sustainable value networks for mobile phones, early product development, system thinking, system dynamics, ecodesign. Other interests: dancing, jogging, photography

**SNELLMAN, KIRSI** – Finnish, M. Sc. (Econ). A PhD student at the Department of Management and International Business, Aalto BIZ. Research topic: Performance of soft innovations in the context of online music. Other interests: emotions and feelings as a means of new value co-creation, customer relationship performance in online music.

**STÅHLBERG, PAULIINA** – Finnish, M. A. A PhD student at the Department of Film, Television and Scenography, Aalto ARTS. Research topic: Change in film production methods due to digitalization in Finland. Other interests: karate, scuba diving, art, mother of four kids.

**SUVILEHTO, JUULIA** – Finnish, B. Sc. (Tech). Has started her post graduate studies at the Department of Biomedical Engineering and Computational Science, Aalto SCI. Research topic: Emotions and social interactions. Other interests: photography, human computer interaction, scuba diving.

**SÄRKKÄ, NANNA** – Finnish, M. Soc. Sci. (Communication), B.A. A PhD student at the Department of Media, Aalto ARTS. Research topic: How designers' and readers' way of understanding and evaluating editorial design differ. Other interests: magazine journalism, graphic design, outdoor activities.

**VENTURA, EMANUELE** – Italian, M. Sc. A PhD student at the Department of Mathematics and Systems Analysis, Aalto SCI. Research topic: Combinatorial commutative algebra and its applications to pure and applied mathematics. Other interests: sports, movies, music.

**VU BA TIEN, DUNG** – Vietnamese, M. Sc. (Tech). A PhD student at the Department of Computer Science and Engineering, Aalto SCI. Research topic: Energy-efficient in ICT and mobile computing. Other interests: future Internet architectures.

**WANG, SHUCHEN** – Taiwanese, M.A. / D.E.A. in Museology. A PhD student at the Department of New Media, Aalto ARTS. Research topic: Cultural heritage in the digital age. Other interests: Chinese contemporary art history, the art market mechanism, and the gender studies in art.

## 2. *Lecturers*

**Aaltonen, Petri**, Partner & Service Business Designer, PALMU Evolution *Orientation to Team Work*

**Aho, Esko,** Chairman of the Board, Verbatum

**Ala-Pietilä, Pekka,** Chairman of the Board, Solidium
*ICT - The Next Sprigboard for Growth?*

**Eskelinen, Jarmo,** CEO, ForumVirium

**Forsén, Kjell,** President and CEO, Vaisala
*Welcome to Vaisala, Globally Connected Weather Business, Vaisala Technologies & Factory Tour*

**Halla, Valtteri,** CTO, Leia Media
*Live Paper Against Mediaquake*

**Kallasvuo, Olli-Pekka,** Individual Contributor, former President and Chief Executive Officer of Nokia

**Kärkkäinen, Leo,** Distinguished Scientist, Nokia Research Center
*Media Technology*

**Kauppinen, Hannu,** Vice President, Nokia Research Center
*Opening & NRC/Nokia update*

**Kivinen, Lauri,** CEO, YLE
*The Media Landscape is Changing*

**Korkman, Sixten,** Professor of Practice, Aalto University
*Euro: The Currency Without a State*

**Kosonen, Mikko,** President, Sitra
*Strategically Adaptive Government*

**Laine, Pasi,** President and CEO, Valmet

**Miettinen, Marjo**, CEO, EM Group
*Strategic Thinking in Family Business for 2013-2015*

**Neuvo, Yrjö,** Professor, Aalto University
*How to Write Your PhD*

**Niemelä, Marita,** VP Strategy, Valmet
*How does the Future of Media Resonate with the Future of Valmet?*

**Pietiläinen, Tuomo**, Reporter, Helsingin Sanomat
*CrowdsourcingOpen Data and Investigative Reporting*

**Rauramo, Jaakko**, Chairman of the Board, Sanoma

**Salmi, Timo**, CEO, Entetrainer Ltd

**Soini, Pekka**, CEO, Tekes
*Tekes - R&D and Innovation Funder with Proven Impact*

**Turunen, Jorma**, CEO, Teknologiateollisuus

**Vesterbacka, Peter**, Mighty Eagle, Rovio Mobile

**Vuohelainen, Risto**, CEO, Canatu

**Vuorensola, Timo**, Director, Blind Spot Pictures

## 3. *Course Literature*


Bit Bang I. Rays to the Future. Yrjö Neuvo & Sami Ylönen (eds.) 2009. Helsinki University of Technology.

Bit Bang II. Energising Innovation, Innovating Energy. Yrjö Neuvo & Sami Ylönen (eds.) 2010. Aalto University.

Bit Bang III. Entrepreneurship and Services. Yrjö Neuvo & Sami Ylönen (eds.) 2011. Aalto University.

Bit Bang IV: Future or Internet. Yrjö Neuvo & Elina Karvonen (eds.) 2012. Aalto University.

Bit Bang V: Changing Global Landscapes – Role of Policy Making and Innovation Capability. Yrjö Neuvo, Erkki Ormala & Elina Karvonen (eds.) 2013. Aalto University.

Media Now: Understanding Media, Culture, and Technology. Joseph Straubhaar, Robert LaRose & Lucinda Davenport. 2013. Cengage Learning.

# 4. Study Programme in San Francisco

## FEBRUARY 3RD – 8TH 2014

**SUNDAY, February 2nd**

2:00 pm
Arrival to SFO airport
BA 795 02FEB HELSINKI (HEL) LONDON (LHR) 0755 0905
BA 285 02FEB LONDON (LHR) SAN FRANCISCO (SFO) 1105 1400

**MONDAY, February 3rd**

09:00 am – 11:00 pm
Institute for the Future + Team Finland Overview (TEKES, FINPRO)
IFTF office at 124 University Avenue, Palo Alto

12:00 pm – 1:30 pm
Marten Mickos, Eucalyptus
IFTF office at 124 University Avenue, Palo Alto

1:45 pm – 2:45 pm
IDEO, Katja Battarbee
715 Alma St, Palo Alto, CA 94301

4:30 pm – 5:45 pm
European Entrepreneurship Thought Leaders Seminar @ Stanford
Hewlett 201 at Hewlett Teaching Center
Topic: European Entry Strategy for Silicon Valley Startups
Speakers: Mikkel Svane / Zendesk, Martin Reiter / AirBnB & Groupon
http://www.europeanentrepreneursatstanford.com/

**TUESDAY, February 4th**

9:00 am – 11:00 am
BlueRun Ventures, John Malloy & Nokia Growth Partners, John Gardner
Nokia Growth Partners, 425 Broadway, Redwood City, CA 94063
+ tour at NestGSV co-working space (Kayvan Barounmand)

11:00am-12:00 pm
Rocketfuel, Richard Frankel

12:30 pm – 2:30 pm
Tesla Motors, Peter Carlsson, VP Supply Chain
45500 Fremont Blvd, Fremont, CA

1 pm – 1:30pm
Presentation & Overview of Tesla [Emerald Bay Conf Room]
1:30pm – 2:30 pm Tour of Manufacturing Line via Tesla Tram

3:15 pm – 4:30 pm
PlugAndPlayTechCenter & Transfluent, Jani Penttinen, CEO
440 N Wolfe Rd, Sunnyvale, CA 94085

**WEDNESDAY, February 5th**

9:00 am - 12:00
Media X conference at Stanford: The Future of Content in a Publish on Demand World
Koret-Taube Conference Room, SIEPR , 366 Galvez St (Gunn Building)
Martha Russell: "Future of Content in a Publish on Demand World"
John Willinsky: "A Brief History of the Intellectual Properties of Learning"
Alex Garnett & Juan Pablo Alperin: "Smarter Scholarly Texts"
Maxine Lim: "WebZeitgeist"
Esther Wojcicki: "Anticipating the Next Wave of Destruction"
Laura Moorhead: "Recasting the Textbook"
Ingmar Riedel-Kruse: "Hybrid Tangible Interfaces"
Nik Martelaro: "Participatory Materials: Learning with Reflective Media"
Ramesh Johari: "Content on the Go"
Ann Grimes: "Transparent Social Footprints"
Take-Aways

12:30 pm – 3:00 pm
Nokia, Chistopher Iwata, Head of CTO Operations
200 South Mathilda Ave., Sunnyvale CA 94086
12:30 Welcome and Q&A with Henry Tirri, Nokia EVP & CTO
13:00 Lunch with Nokia CTO Sunnyvale staff
13:30 Timo Ahonen, Research Leader - NRC Media Technologies Lab, Sunnyvale, CA
14:00 Klaus Doppler, Research Leader - Wireless Systems - Berkeley, CA

Evening program possibilities:
(Requires own transportation and registration)

6:00pm -9:00pm
The Age of Context by Robert Scoble
Google Quad 3, 468 Ellis Street, Mountain View
http://www.meetup.com/gdg-silicon-valley/events/161390522/

**THURSDAY February 6th**

8:45 am – 11:00 am
Google Executive Briefing Center, 359 N. Whisman Avenue, Quad 7 Bldg, Mountain View, CA 94043
9.00-9.45 Google Enterprise/Cloud, Dan Powers - Director Google Cloud Platform
9.45- Android - TBD
11.00 Youtube - TBD

11:30 am – 1:00 pm
Electronic Arts, Andrew Parry,
Digital product strategy and business operations
209 Redwood Shores Pkwy, Redwood City, CA 94065

2:30 pm - 4pm
Amazon, (Amazon Web Services)
Bhavik Vyas, Media & Entertainment Partner Eco-system Manager
475 Sansome Street, San Francisco, CA 94111

6:00pm ->
Exploratorium (Science Museum)
http://www.exploratorium.edu/
Pier 15, San Francisco, CA 94111

**FRIDAY, February 7nd**

09:00 am – 10:00 am
Berkeley, Bjoern Hartmann, Assistant Professor in CS,
Room 242, Sutardja Dai Hall, Berkeley, CA 94720-1760

10:00 am – 12:00 pm
Berkeley, Prof Greg Niemeyer
Room 242, Sutardja Dai Hall, Berkeley, CA 94720-1760

~1:15pm
Internet Archive, Brewster Kahle, Founder
300 Funston Avenue, San Francisco, CA 94118
Tour at Internet Archive (public tour of the premises with other participants)

5:30pm-6:30pm
Reflection at Hotel, (private banquet room)

6:30 pm
Closing dinner at Hotel Whitcomb (private banquet room)

**SATURDAY, February 8nd**

19:45
Departure from SFO airport:
BA 286 08FEB SAN FRANCISCO (SFO) LONDON (LHR) 1945 1400
AY 840 09FEB LONDON (LHR) HELSINKI (HEL) 1825 2320

# 5. San Francisco Study Tour Reports

## Summary of visits between February 3rd – 8th 2014

### Monday, February 3rd

#### Institute for the Future

The Institute for the Future (established in 1968) is an independent, non-profit organization, with 60% of women employees. The institute helps all kinds of organizations and provides practical foresight for a world undergoing rapid change. From intimate workshops to global online games, IFTF offers a toolkit of frameworks, processes and platforms to tap the best insights of groups to imagine – and create - the futures they want for their organizations, their communities, and the world. The IFTF has four core programs: (1) Ten-Year Forecast; a broad scan of the changing global landscape, (2) Technology Horizons; a deep dive into cutting-edge technologies and practices, (3) Health Horizons; cutting-edge perspectives on health care and the larger ecosystems of well-being and (4) Global Food Outlook; a probe into the dilemmas and innovations in food and agriculture. In addition, IFTF also run programs in important areas such as the Future of Learning.

The future predictions are designed using different methodologies (IFTF has been a pioneer in developing tools and methods to forecast future). Few examples of such methodologies include Ethnography, Scenarios and Signal scanning (without forgetting Delphi technique).

According to IFTF, a signal is typically a small or local innovation or disruption that has the potential to grow in scale and geographic distribution. Signals try to capture an emergent phenomenon before traditional social science methods can catch this phenomenon. Signals are different from trends. Trends typically capture something that has already become obvious, but signals focus on the margins of society that can reveal disruptive innovations in future. Instead of writing heavy future reports, it is better to make different executive maps. The long-term goal of the company is to stretch thinking and consider all the different ranges of the future, based on identifiable signals. IFTF makes predictions for the periods of 0-3 years or 3-15 years. The scope of these predictions is global. While evaluating the past predictions, IFTF claims that their predictions have been ~75% accurate. The technology is usually easier to predict and the politics is typically really hard. In summary of the future predictions, IFTF tends to follow the view of Alan Kay *"The best way to predict the future is to invent it"*.

### Finpro

FINPRO is the national trade, internationalization and investment development organization of Finland located in Silicon Valley. FINPRO supports client's international growth and success by enabling them to be in the right market at the right time with a competitive concept and offering. Furthermore, their role is to guide their partners in the ways to get into markets.

During the presentation from FINPRO, we learnt about their perceptions on the current buzzwords such as wearables, eVehicles and big data. FINPRO has a sound perception regarding the ways things are happening in Silicon Valley. It is interesting to know that 50 percent of VC (venture capital) in the USA is occurring in the Valley. It is a perfect place for international companies and startups. 50 percent of the CEOs in Silicon Valley are born somewhere else than in the USA.

FINPRO has helped to establish already 48 Finnish companies in Silicon Valley. It has a proven concept called Gaselli, which focuses on similar activities as Tekes in Finland. After the startups underwent through boot-camps in Finland and learnt how to pitch, FINPRO brings those startups to Silicon Valley for at least 4 months. It guides the startup in many phases, for example market assessment, work flows and attracting investors. In addition, FINPRO also observes the processes of future by looking globally into processes which are happening around the globe and use that information in Finland to better guide the future watch process. Each year FINPRO selects a specific theme and for this year the theme revolves around the new way of manufacturing.

### Eucalyptys

Eucalyptus is open source private cloud software for building private and hybrid clouds that are compatible with AWS APIs. With AWS-compatibility, the open source software pools together existing virtualized infrastructure to create private or hybrid cloud resources for compute, network, and storage. Marten Mickos, CEO, talked about "What's Happening" his views about the future. One of the key messages was that big things, like personal computer, happen over a long time. Many of today's big things were the failures of the previous decades and it just took time to discover how to make the failure commercially successible. These commercially successful or interesting things usually happen via trail-and-error and due to an unconventional thinking of a man. Marten was worried about user sovereignty on the internet. This means that people's rights regarding being e.g. private, anonymous, private and not-tracked must be prevailed.

Marten Mickos left us with a challenge to guess next business where the long tail effect will have effect. Google did it for searches, Amazon did it for books, but what would be the next business where the success of the business is based on the long tail.

## IDEO

IDEO is a global design firm that takes a human-centered, design-based approach to help organizations in the public and private sectors in innovation and growth. IDEO envisions new companies and brands, and design the products, services, spaces and interactive experiences that bring them to life." The IDEO visit was hosted by Katja Bannerbee and followed by Barry Katz.

IDEO was established in 1978 and today comprised of 600 employees around the world: half in California, others in Chicago, London, Munich, Shanghai, Tokyo, Mumbai and Singapore. Employees exhibit various backgrounds from designers to engineers and doctors. IDEO designs anything from tobacco and weapons to sanitation and educational experiences. The company is a pioneer of industrial design, but has been expanding its scope to the business design. Some famous examples that IDEO has designed are Apple's first mouse and Palm PDA.

Usually, a customer comes with a problem and IDEO tries to solve it with a design. However IDEO first looks for the real problem, which could be different from the one the customer recognizes. And then the company tries to design ways to solve the core problem. Much of the work involves intellectual properties and future scenarios.

One of the key factors behind the success of IDEO is the team diversity. IDEO has very wide portfolio of competencies. Teams are reshuffled for every project and the key for choosing resources for a project is the willingness to take the job. The goal has been that for every project the team is different but with right skills to accomplish the task. The resourcing is supported by very low organizational hierarchy. There is only one layer between the CEO and the most recent employee. Interesting none of the employees has an office, not even the CEO. Instead the teams are given dedicated workspaces and they are allowed to find the most efficient way of solving the problem during the project. All this leads to a special working environment, where employees feel that they are (in a way) a part of a family. IDEO believes in the culture of teaching and learning and collaboration with universities.

According to Barry, human centered expertise is the key. He also emphasized that prototyping is the core. IDEO prototypes anything from banks to business models to digital interfaces. As an example he introduced the IDEO´s founder, design legend David Kelley and showed the way he worked on the first Apple mouse 1980.

## European Entrepreneurship Thought Leaders Seminar

The Stanford Engineering's European Entrepreneurship Thought Leaders Seminar is a weekly speaker series. It was launched six years ago. The series presents industry leaders from Europe's high technology startups, university research and technology commercialization communities to share their insights and experiences with aspiring entrepreneurs residing in Silicon Valley.

The Session on Monday February 3, 2014 featured two speakers: (1) Mikkel Svane, the founder and the CEO of Zendesk, and (2) Martin Reiter, the founder of Groupon and Airbnb.

Mikkel Svane founded Zendesk with Morten Primdahl and Alexander Aghassipour to make great customer service available to everyone and create software that people love to use. In 2009 he moved the company from Copenhagen to San Francisco. During his earlier time in Denmark, Mikkel led a service-management consulting group, founded a software company for online community and launched Denmark's first community portal. Zendesk provides help desk ticketing, issue tracking and customer service support. Today the company has 500 employees. In his presentation, Mikkel talked about his business birth and experiences. Mikkel explained the way Zendesk is deeply connected to the concept of cloud. When companies and organizations grow, the problems with a shared customer support email inbox become even more significant. As cloud-based customer service software, Zendesk is the fastest and easiest way to boost the efficiency of a customer service. One of the marketing strategies of Zendesk includes approaching the global market, finding similarities

between apparently different markets. This was one of the keys of the success. Mikkel predicted that these similarities will grow in future. He also mentioned about the significance of entering and localizing into certain markets such as Germany, Italy, Spain and France.

Based in Vienna, Martin Reiter studied at the University of Graz, where he obtained his masters degree in Law, Business and Philosophy. He led Airbnb's international operations from 2011 to spring 2013, during which time he expanded the sales and marketing team across 12 offices in four continents (North America, Asia, Latin America and Europe). Martin served as a member of the company's executive team and helped the company scale from 40 to 700 employees in two years. Before joining Airbnb, Martin worked at McKinsey from 2007 to 2011 and then he joined Groupon. In his presentation Martin suggested marketing and organizational strategies to open a company in other markets. The strategy consists of consist a very strong market where the company operates, while penetrating deeper and deeper other markets as well. Martin mentioned that in order to enter and conquer a new market, one of the key factors is to be aware of the ways to operate effectively and concretely. Martin said that the most difficult markets to penetrate and conquer are Japan and China. He compared the situation in Europe and USA, discussed the underlying steps towards a successful management experience.

### Tuesday, February 4th

#### BlueRun Ventures & Nokia Growth Partners

The day started with the joint presentation of two venture capital firms, BlueRun Ventures and Nokia Growth Partners represented by general partner and co-founder, John Malloy and partner, John Gardner respectively.

BlueRun Ventures is an early stage venture firm, focused on startups working in mobile. The list of BlueRun Ventures current and past clients includes companies like Waze, Paypal and Banjo to name a few. Besides Silicon Valley the firm has a presence in Beijing, Shanghai, and Seoul. BlueRun Ventures is a relatively small player on the scale of the Valley, however the firm stands out by focusing on currently trending mobile technologies and early stage ideas, which have high risk/high return potential.

Nokia Growth Partners (NGP), not surprisingly, work in the field of mobile technology and mobile services as well. However, in the contrast from BlueRun Ventures, NGP is a corporate venture firm, which aligns its strategy, closely to the parent company (Nokia). The companies in the portfolio of NGP are also dominated by mid- and late stage startups, with more proved track record. Current clients of the firm include startups with relatively established names such as streaming service Voddler, language learning system Babbel and mobile games developer Grand Cru.

While focusing on one industry, two presenters had quite contrasting views on the current mobile landscape, and the near future. John Malloy talked about break-

through ideas and focused mostly on "where will **we** be in five years", pushing aside issues like monetization and proven ideas (like mobile games). John Gardner in contrast, prioritized mobile enterprise clientele, mobile games and digital marketing platforms. This helped to build a great discussion with two contrasting perspectives on essentially one industry

### nestGSV Co-working Space

Baroumand, the former COO at Plug&Play Tech Center, explains that his current company is an "ecobator" – meaning that it incubates ecosystems taking a holistic approach. He starts the talk by reminding that we went through different eras in history: from industrial, over atomic to digital and currently we live in an innovation era. Today happens the convergence between technology and innovation. He also states that the schools are not prepared to serve well students and that large percent are graduating without jobs in the first year. Thus, one of the answers is entrepreneurship, as a global trend in every country. He then continues to explain what makes Silicon Valley special. In this place, they have programs to educate entrepreneurs who will thus make less mistakes. NestGSV is one of the companies that provide services so that the entrepreneur will focus on his work, which will accelerate innovation process. In the answer to the difference between his previous company, Plug&Play, and nestGSV, he explains how now they work to take bias out of geography and want to focus on best companies by sector from the whole world. Thus nestGSV has opened global entities in NY, Switzerland and Vancouver. NestGSV also offers open accelerator program in order to make entrepreneurial education available to everyone.

There are currently around 80 companies in the ecobator and they stay on average for 2.5 years.

### Rocket Fuel

Rocket Fuel is a company in automated advertising world. It has been funded by NOKIA and some other venture capitals. The company wants to follow forces for disruption and change in the world of media. According to Frankel, the changes in the world of media can be narrowed to the 3 following forces:

1) **Devices & mobile** – the way the consumers are engaging with media is changing.
2) **Automated** means of content creation, discovery, sharing and employing. Thus, he claims, the advertising also needs to get automated.
3) **Measurement** – thanks to the fact that all the media is getting digital, it is also getting measurable.

He then gives an unexpected answer about social data value for advertising models, saying that the social data showed to be only useful in their case for social content *interaction* and *entertainment* – as those two actions can be *predicted* from social.

Another question is in regard to privacy of the data, and we find out that Rocket Fuel obtains huge amounts of data for each person, however that everything is anonimized. He also claims that the company gets actually requests from some people about information how they can provide more of their personal data, so that the company can provide to them better recommendations. Thus, the people are divided between quite opposite groups when it comes to perception about the privacy of their data.

## Tesla Motors

*Editor's note*: due to a non-disclosure agreement, the following trip report is based on publicly available data.

> *"Tesla is a hard-core technology design company […] that's why we've really done our best to bring this technology to mass-market by working with companies like Toyota and Daimler. "*
>
> – Elon Musk, co-founder and CEO (source: http://youtu.be/mURbzh9t0_0?t=9m16s )

> *"At its core, the Tesla Model S is simply a damned good car you happen to plug in to refuel."*
>
> – 2013 Motor Trend Car of the Year Review

Founded in 2003 the company's goal is to create compelling electric cars, based on the premise that if nobody creates electric cars that are better than conventional cars, they will never be successful. Tesla Motors revealed it's first EV the Tesla Roadster in 2006, a BEV sports car, which sold (after a series of delays) 2.500 vehicles between 2008 and 2012.

The Tesla Roadster was a very expensive and very exclusive test platform for the powertrain and battery platform, which saw several recalls and updates during its production period.

Based on their experience with the Tesla Roadster the company started selling their Tesla Model S in June 2012 in the US (Europe: August 2013), a full-sized 5-door sedan as a luxury car powered by li-ion batteries in the floor.

One of their arguments is that depending on the sources of electricity the co2-footprint of the car is about 25% of a conventional car. They have a informative info-graphic on their website: teslamotors.com/goelectric#electricity

The range of their electric cars depends (as any car) highly on the type of usage, and recharging takes between 75 minutes and 60 hours (depending on the type of outlet). The fastest charging method is their own socket dubbed "supercharger" which the company offers 14 public stations in Europe and 71 in the US.

In order to avoid waiting the company also plans to offer a full battery replacement in 90 seconds (fully automated) at their recharging stations. According to a press release each of these stations would cost approximately US$500.000 and owners would have to come back to the same station to collect their own battery and return the replacement (the swap costing around 80$).

Better Place, a company offering a similar service declared bankruptcy in 2013.

According to the companies' CEO the hype around the Tesla Roadster "convinced a lot of other companies to build full EVs: GM, Nissan, Toyota, Daimler."

Apart from working with other car companies, they are currently developing a system for energy storage with a partner company SolarCity (source: http://www.nytimes.com/2013/12/05/business/energy-environment/solarcity-to-use-batteries-from-

tesla-for-energy-storage.html), in order to allow companies to locally store (cheaper) electricity for use during (the more expensive) peak-demand hours.

### Plug and Play Tech Center

After a short bus ride, we arrived at Plug and Play Tech Center at Sunnyvale. Plug and Play Tech Center is a business accelerator, which specializes in tech startups. They have over 300 startups in 3 locations around the Bay area. It was founded by Saeed Amidi in 2006 and has since helped raise over $1 billion.

To begin our visit our host, Mohannad el-Khairy, took us on a tour around the Sunnyvale offices. Plug and Play Tech Centers offer a variety of services to startups under their roof and these services, from the executives in residence program to the over 100 community-engaging events each year, were nicely concretized during the tour. We saw many pavilions for different countries around the cubicle maze, where the younger startups work. We were told that there are a number of governments who sponsor startups' first foray to the US market.

The atmosphere around the offices was very nice, and we stopped to chat with and ask questions from a number of startup teams along the way. Finally, we were guided to a large seminar room for the official slideshow with facts and figures.

### Transfluent

We continued in the same space with Transfluent, a startup residing in the Plug and Play Tech Center. Transfluent is using human translators to provide nearly instant translations of short texts, such as social media updates. It is currently the only Finnish company in the Plug and Play Tech Center, even though there is an abundance of Estonians all around the place, which we found a little odd. The CEO of Transfluent,

Jani Penttinen, told us about his personal journey to Silicon Valley and about the company as well. Since Tuesday began with two VC:s discussing their point of view, it was very nice to get a chance to hear the other end of the story - the entrepreneur.

### Wednesday, February 5th

#### The Future of Content in a Publish on Demand World

A highlight of insights from Stanford research projects and innovations in educational content and print on demand technologies!

**John Willinsky**: A Brief History of the Intellectual Properties of Learning
John Willinsky is Khosla Family Professor of Education at Stanford University and also well known for his support to open access movement. In his talk he gave a short history of intellectual property and discussed in a lively manner the contradictions when the publishers are trying to make money of content and authors and scholars would like to have open access to content for learning purposes. He compared the situation in a failure to make a distinction between Justin Bieber and academic research. He mentioned the new Omnibus Appropriations Bill in the U.S., which says that any researcher receiving public funding has to provide open online access to the resulting articles within 12 months of publication.

**Alex Garnett & Juan Pablo Alperin**: Smarter Scholarly Texts
As part of Public Knowledge Project the presentation introduced a document markup plugin, called the Open Journal Systems (OJS) plugin. It is intended to support the author in publishing workflow. The author can upload an article it to the parsing and formatting engine which returns the article in several formats: For reviewers only (author details stripped out), layout version in pdf, xml-version and html-version for web-viewing. The purpose is to help in making articles in more readable and better quality and also free the publishers from manual formatting work.

**Maxine Lim**: Webzeitgeist
Webzeitgeist (Zeitgeist = spirit of the age or spirit of the time) is a platform for large-scale design mining. It comprises a repository of over 100,000 web pages and 100 million design elements. Design mining for the web means using knowledge discovery techniques to understand design demographics, automate design curation and support data driven design tools. The talk also presented what new classes of data-driven design applications Webzeitgeist enables.

**Esther Wojcicki**: Anticipating next wave of disruptions
The talk discusses the horizon of disruptions that future generation will accelerate as they join the active audiences. Today American education faces a problem and that is trust. School administration does not trust teachers and teachers do not trust

students. Now they have scripted teaching which is basically lack of trust. Scripted teaching does not create critical thinkers. It cuts creativity of students. The demand for skills changed world wide today. Now every student has laptop, smartphone or tablet. We should let them use intelligently. However, the main point is to let students think, to let them find information, not to memorize useless facts. As for example, kids are really interested in learning and they always look up things on their smartphones all the time.

**Laura Moorhead**: Recasting the Textbook
The main focus of this talk was to recast the history textbook as an edited on demand, collaborative collection of historical narrative to help student evaluate the sources of information and better understand the perspective from written history. They build up use case to help schools, museums, libraries and media companies to allow the educational development of young people and educators by using primary source documents and interactive technology.

**Ingmar Riedel-Kruse**: Hybrid tangible interfaces
The project aims to develop biology games named as "biotic games" to inspire and educate the general public online about the fascinating biological phenomena that happens usually in the "wetlab".

The computer simulations in the games could engage the online learners in real-time laboratory experiments by remotely printing reagents directly onto substrates and receiving images of real-time results.

Apart from setting these online gamified learning tools with a scalable and economic online platform, the team tries to set up a way as well to measure the learning results.

The findings are:

We created experimental platforms with technological infrastructure for remote, scalable wet labs. One platform permits chemical stimulation of cell culture systems; the other platform permits real life interaction with microorganisms and provides real time feedback to users. Both are capable of engaging up to 100 students in parallel. The user interfaces are adaptable to laptop or smart phone, permit robotic control of reagents, afford time-lapse movies of the experiments with VCR controls, and include a discussion board. Use of the platforms has been piloted with college students.

**Nik Martelaro**: Participating materials: learning with reflective media
Robot interaction with the user can enhance his/her design ability is the hypothesis of this study. The team uses a sociological method:
Locus of agency: Embedded vs. external by learning agent

Interest: interested vs. uninterested

A total of 68 participants is studied to find out the effects fo interested learning agents and their locus of agency on agent perceptions, task perceptions, and learning outcomes.

The finding confirms the hypothesis: One of the most striking outcomes of our study was how powerful the agent interest manipulation was in engaging the students in short, meaningful conversations. We found that a shift from external to embedded agents can positively influence learning processes and outcomes while not affecting perceptions of the agent. Embedding the agent can make the learning task seem less stressful.

**Ramesh Johari**: Content on the Go

This was a discussion on sales (price) and visibility in the marketplace. He outlined three key players: Platforms (Google and Apple, whose roles are to distribute, recommend and help users search for apps), App developers (both businesses and individuals), and Users. He also described two characteristics of the ecosystem: fast dynamics (eg one million downloads in nine days for Draw Something), and fierce competition (largely because of the low entry points). His research question was: Do ranking charts influence demand? His answer was yes, they do. App prices change frequently, and often app developers drop prices to increase ranking (popularity). This happens in cycles, according to Ramesh. The dropped price boosts rankings and the cheaper price, when combined with the larger number of purchasers, boosts revenue.

**Nokia**

*NRC is Nokia's corporate research arm and part of the CTO organization. NRC teams are strategically located around the world to collaborate with leading universities, research institutions and industrial partners. Nokia Research Center's team in Sunnyvale is focused on research into novel imaging technologies, in particular computational photography; collaborators include MIT Media Laboratory and Stanford University. Sunnyvale NRC researchers are seeking innovations through novel multimedia solutions where interactive and multimedia technologies are combined together. NRC's Berkeley Wireless System team collaborates closely with the UC Berkeley focusing in radio systems.*

We had privilege to visit NRC's new locations in Sunnyvale during the 3rd day of our study tour in California, Palo Alto. **Henry Tirri**, Head of R&D, Senior Vice President and CTO of Nokia Group welcomed us to the afternoon with his people. We were offered a lunch with Nokia representatives mingling together with each table of BitBangers before the official presentations.

PhD, **Klaus F Doppler** from the Nokia's Berkeley Wireless System team presented their research areas. First we heard about the trends until year 2020: in order to support one Gigabyte experience for the user, networks need to be upgraded to meet this increasing demand, too. According to Nokia, this request for more than 1000x in capacity is answered by 10x more spectrum, 10x more spectrum efficiency and 10x more base stations' density compared with today. Other areas touched during the presentation included cognitive networks, high-efficient wlans and software radio projects.

PhD, **Timo Ahonen** showed us projects his team has been researching regarding the computational photography. Challenges in producing high quality images with smaller devices are manifold. Computational photography occurs in the intersection of optics, image processing, computer vision and computer graphics according to E-V Talvala. One challenge in the photography for the smaller cameras such as smart phones is the low light and to this challenge Timo's team has been focusing on; results manifesting for instance in the Lumia's 1020's good low light performance (see for instance light painting video: http://www.youtube.com/watch?v=bZO__KO3UmY&feature=youtube_gdata). Other areas of current research interests included overcoming the shallow depth of field in the smaller cameras, how to capture and process image stacks by combining even sensory data with multiple images stacks into "context photography" and of course, how to inspire new experiences in the field of photography.

**Atlas Solutions, a subsidiary of Facebook**

A coincidental encounter with a Facebook employee on the flight to San Francisco resulted in a small group visit to Facebook main campus in Menlo Park. Our hosts Andrzej Prokopowicz and Lucy Toan had become Facebook employees when Facebook acquired Atlas Solutions from Microsoft in 2013. Because we were a small group, we could enjoy a lively discussion instead of listening to off-the-shelf company presentations. Our hosts were enthusiastic about their work and seemed excited about the new possibilities that the acquisition had brought.

Atlas is not just an ad vendor, but also a platform for managing, tracking, and measuring marketing campaigns. They handle all relationships with the actual publishers as a service to the advertiser. Usually, in online advertising, the advertiser

rewards the last ad that the user clicks before purchasing a product. This click takes often place at a search engine, such as Facebook's competitor Google. However, the user could have seen the advertisement several times before the final click, for example on Facebook, and these earlier impressions have a large impact on the user. Therefore, if a user sees ads related to a campaign on several publishers' platforms, the other publishers should be credited also, not only the last one. Atlas promotes the use of engagement mapping, which is a model for crediting the ads displayed to a particular user. Engagement mapping is accomplished by tracking the user and giving weights to different ad impressions or interactions that lead to a conversion – the fulfillment of a goal set by the advertiser, e.g. a product sale, a user registration, or an app download.

With Facebook ID, Atlas can now track users across devices. If a user logs on to Facebook on any of their devices, Atlas can connect the cookie stored on that device to the user's Facebook ID. Atlas is for Facebook what DoubleClick is for Google, and with the Atlas acquisition, Facebook has strengthened its position as a competitor of Google. The competition is not only directly in advertising, but also in understanding the users via the data that they collect. According to our hosts, Facebook's vision for advertising is to deliver ads that interest the users instead of annoying them.


Facebook moved to former Sun Microsystems campus in 2011, and now four thousand Facebook employees work there. All meals are free in the on-campus restaurants, even homemade ice cream from the Sweet Stop dessert shop. The micro-kitchens around the offices provide snacks to fuel long working hours.

## Google


*Placemaking at Google's satellite campus.*

The first impression of our visit to the satellite campus of Google was dominated by a sense of placemaking meaning that the whole campus looked, smelled and felt like Google, just as the visits to Facebook and Electronic Arts campuses. Multi-colored bikes, a multi-colored road and multi-colored furniture lead us to a meeting room, where the show began. Three representatives were ready to introduce us to the techy-savvy world of Google: a representative of the Cloud platform products and services, an associate product manager of Android, and a Youtube representative who gave her speech through Google Hangouts about Youtube.

The first thing that caught my attention in the meeting was that all the applications, hardware and software used were Google's which was quite logical but still something that not many companies are able to do. We got to test Google glasses, the presentations were showed employing Google drive and Google Hangouts, one of the presenters took pics with the Google glasses during the presentation on Google Plus and demonstrated basically everything he could during the presentation illuminating some of the beautiful things Google is able to deliver. While presenting, they really seemed to breathe, taste, smell, feel and love the company they are working for which is something that we could carry a piece of with us to the cold Northern Europe.

Sustainability seems to be a key driver in Google's actions. Examples of bike to work day and the amazing amount of hybrid or electric cars charging on the parking lot were also examples of corporate responsibility and sustainable mindset they are spreading. They also aim to design carbon neutral data centers. Greenwashing or not, at least they talk and take actions which is promising.

At the same time as the whole meeting showed to me as a huge advertisement, I was very fascinated about the Googlish spirit of "I work the way I live". It does not cost anything to be inspired and enthusiastic about what you are doing. I admire the ability to jump into something so intensively but at the same time I am a bit suspicious, as a true Finn should be, towards their ability to think about the turn side of

the coin while running so fast. They might get blinded by the speed they are taking over the world and solving its problems.

In the end, it seems Google is still sticking to the principles mentioned by the managers and founders of Google in the earlier years: “Google does very well in taking complex things and making them simple”, “We are not evil” and “Google is a tech company providing solutions for individuals and industry”.

### Amazon Web Services


*Bhavik Vyas gave thorough introduction to Amazon Web Services. (Photo: Jussi Hakala)*

On Thursday afternoon we left Silicon Valley and moved to the Financial District of San Francisco City and its impressive skyscrapers. At Amazon Web Services, M&E Partner Eco-System Manager **Bhavik Vyas** gave us a thorough introduction to Amazon’s business and infrastructure solutions to companies, and media field in particular.

Amazon had started as an online bookstore. It had developed an efficient platform and infrastructure for the network of bookstores and online market, through which it was possible to manage a range of billions of products. It became clear that many other companies could utilize the knowledge they had gained and the infrastructure they had created. This is how the foundation for Amazon Web Services (AWS) had formed. Now their mission is to enable businesses and developers to use cloud services to build scalable and sophisticated applications.

The list of enterprises and internet businesses that use Amazon Web Services and their servers is impressive – among others Airbnb, Flipboard, Tumblr, Pinterest, Foursquare, Samsung, Shell, Unilever, IBM, Ericsson and Spiegel. For example, Netflix runs nearly all of its online video services on AWS. Vyas emphasised the security

issues and trust, which are of the highest level at AWS and which is why also for example the government of United States of America uses their services.

Why do or should companies adopt cloud services? Vyas highlighted flexibility and efficiency: start-ups and companies don't need to invest on IT, instead with AWS they can always get the service they need when they need it, pay just for what they use – so that they can concentrate on their core business. AWS customers also benefit from the economies of scale of this huge global player.

Media industry is a strategic focus area for AWS, and AWS aims to be the preferred cloud media infrastructure provider in that field. The current situation is very complex for media content providers as the amount of content and number of different devices are all the time increasing, consumers want to have all content available anytime, anywhere and media consumption is getting more and more multiform. According to AWS, strategic use of the cloud used to be a competitive advantage, but is now a core competency in managing this complexity.

**Exploratorium**

*Project director Claire Pillsbury told about the history and objectives of science museum Exploratorium.*

In the evening we visited the acclaimed science museum Exploratorium by the seaside of San Francisco. Before entering, Project director **Claire Pillsbury** introduced the background and basics of the museum to us. Ever since its foundation (1969), the mission of Exploratorium has been to change the way the world learns.

Instead of a conventional museum, Exploratorium was more like a scientific funhouse or an experimental laboratory or art gallery. Visitors were invited to participate and interact. We had the good fortune to be there on the first Thursday of the month and were able to experience the monthly *After dark* event. These events are designed exclusively for adults. As Valentine's day was approaching, the theme of that evening was Sexplorations. It was possible for example to watch a live egg become fertilized and explore interventions for infertility.

The exhibition was extensive and the hundreds of exhibits were captivating, clever and fun. Yet the most memorable thing might have been the charming and enthusiastic atmosphere: all the galleries of the huge (31 0000 $m^2$) space were crowded with young and not so young adults who were enjoying the exhibits. Exploratorium really is an "intellectually stimulating playground for adults", as it was advertised.

## Friday, February 7th

### University of California, Berkeley: Electrical Engineering and Computer Sciences

The Department of Electrical Engineering and Computer Sciences (EECS) recognize the need for diversity when producing future leaders, creating innovative technologies, and serving society. To meet the mission the department emphasizes an inclusive environment that respects all individuals regardless of race, ethnicity, gender, age, religion, language, abilities/disabilities, sexual orientation, identity, socioeconomic status, and country of origin. Creative technologies and an enhanced academic experience for our current and future students arise from exposure to a diverse array of perspectives.The EECS faculty and students collaborate on a range of programs, from undergraduate and graduate outreach to academic support and pre-professional advancement.

Björn Hartmann is the assistant professor at the Computer science division and briefly introduced the himself and the department. His main research interest is the Human-Computer Interaction focusing on the interfaces between human and computer and how humans can use computing devices to complete their tasks. He is also a co-founder of the CITRIS Invention Lab which provides students creative technologies and serves as a foundry / an incubator for the them. Any Berkeley student can sign in to innovate (one needs to be quick though) with the cost of 125 dollars / term. The tools in the lab for manufacturing the different kinds of prototypes include e.g. two different 3D printers, a laser cutter and a multimaterial printer for printing (e.g. conductor circuit boards). Prototypes can lead to more agile development by creating entirely new ideas, developing the existing ones further and they may also enhance chances when applying for funding.

An example of a prototype created by 3D printer. Note that all the pieces rotate within the circle.

Posters from previous projects were also presented on the walls. Several good ideas have risen from the lab and few concrete examples are the Car PhD which is an application minimizing fuel consumption and an intellectual watering system for plants utilizing solar power. The space seemed to serve well as an inspiration and as a testbed for many research projects.

**University of California, Berkeley: Center for New Media**

Berkeley Center for New Media (BCNM) is a research institution formed around a trans-disciplinary community having 120 people from 35 different departments of Berkeley including Architecture, Philosophy, Film & Media, History of Art, Performance Studies, and Music; the Schools of Engineering, Information, Journalism, and Law; and the Berkeley Art Museum. Their mission is to critically analyze and help shape developments in new media from cross-disciplinary and global perspectives that emphasize humanities and the public interest. PhD students in their main program are given designated emphasis on one specific field and then broaden their studies by interdisciplinary work.

Greg Niemeyer, the director of Berkeley Center for new media, gave us the introduction to research going on in the field of new media. Starting with the example of beer delivery drones, which were banned by aviation officials, he shows that conventional critique and analysis on modern innovations is usually -too slow and the best critique is innovations and creating new media. The drones are just one example that cannot be discussed purely from technological or cultural point of view; technology and culture co-constitute each other. Thus inter-disciplinarity is needed.

He sees that two morphogenic parameters based on Alan Turing's theory of morphogenesis shape new media: inhibitors and promoters. A producer of information is the promoter and a controller of the information is the inhibitor. He illustrates this from examples from music industry: Napster, lot of production and little control, iTunes, some production very strict control, and Spotify, ideal balance between production and control.

Niemeyer also speaks about the fiction as a tool to study future. He tells that the evolution of different futures presented in science fiction literature during past decades has contained valuable information. Fiction is not restrained in time and space so it offers fruitful platform for ideas. So when looking into the future, the future should be made fictional on purpose because it always stays uncertain. He mentions also fan-fiction that is usually multiple times more text than original fiction itself and needs to be studied as a field itself.

Niemeyer states that the collaboration should be treated as discipline itself. It requires as much effort as conducting research within one disciplinary. In collaboration different value structures collide making it challenging: one wants to make money while other wants accuracy and reliability. Nevertheless, he sees collaboration as a value itself. In BCNM they have no definite groups, but people are picked for the each project. People also meet weekly for the lunch, which is organized just by offering them lunch.

After telling us about the projects and events going on in NMBC, Niemeyer ends his presentation with example of electricity network and trust. According to surveys people tend to have high trust on traffic lights but low on power plants. Still traffic lights cause more accidents than power plants. Role of the media is communicating the facts that people are not realizing, in this case that the traffic lights and the power plants are part of the same automated electricity network. As a solution to a problem of describing such complex processes, relating them to simple human actions, and communicating them to wider audience he presents concept of engagement. He presents six factors of engagement:

1. Drama (Narrative and ludic),
2. Ownership (Material and cultural),
3. Transparent (Feedback and metrics),
4. Reputation (Personal and collective),
5. Separation (Temporal and spatial) and
6. Scalability (Instance and frequency).

He presents different ways of communicating that exhibit some of these factors and a one medium that has all of these: birthday cake of his three years old daughter, so question in a larger scale seems to remain unsolved.

**Internet Archive**

We met with Brewster Kahle, who founded the Internet Archive in 1996. "We are building Alexandria 2.0", he explained to us in his introduction to the archive. "We started with archiving and preserving the web pages we could find in the World Wide Web, and now we are probably the only place where old versions of many sites can be recalled", he continued. "Our mission is universal access to all knowledge, but we also respect the copyright laws. We work with the libraries and publishers all over the world and we get donations or we buy the books. We scan them in our library and users can borrow them digitally. However, only one person is given access to each book for up to two weeks".

Internet Archive started in 1999 collecting books and digitizing them, now in 30 scanning centers in five countries. They digitize about 1,500 books a day and the collection has grown to over 4,4 million books as of July 2013. (Wikipedia http://en.wikipedia.org/wiki/Internet_Archive).

The headquarters of Internet Archive are located in San Fransisco Richmond District. They have data centers in Redwood City and Richmond in California. Their collections are mirrored in Alexandria, Egypt to be safe in case of catastrophes.

Today the collect all kinds of material, born in digital format or converted to digital format. According to their fact sheet they have

- 150 billion archived webpages, from 1996 until a few months ago
- 3,500,000 books and texts
- 200,000 books for lending, 2,000,000 texts for print disabled
- 1,000,000 movies and videos
- 1,000,000 audio recordings
- 370,000 tv news broadcasts
- 100,000 live music concerts
- 4,5 billion URLs archived

Internet Archive is a non-profit organization. It has an annual budget of $10 million, which comes from both service revenues and donations and other similar sources. It has about 200 employees, most working in the book scanning centers. An interesting detail Mr. Kahle showed us is a collection of nearly 100 ceramic figures representing employees of the Internet Archive in the Great Room of the Internet Archive. The sculptor is Nuala Creed.

Internet Archive allows the public to upload digital material to its data cluster. Mr. Kahle was very interested in our Bit Bang 6 course and now the previous Bit Bang books are also uploaded into the Internet Archive.

Link to their website: https://archive.org/about/

Link to Wired article: http://www.wired.com/threatlevel/2012/08/brewster-kahle/all/

**Closing Dinner**

*The somewhat crazy Professor from the Future and two confused PhD students in Group 4's play. (Photo: Siru Sihvonen)*

The celebrations of the last evening were carried out at the Hotel Whitcomb. First we had a general discussion about the trip – what had been the main things we had learned and what ideas should we take home with us. Three things stood out. First of all the attitude and ambition: in Silicon Valley we sensed an admirable courage and determination, people seemed not to be afraid of failures. Maybe we should lift the ambition level also in Finland – as Martin Reiter from Airbnb encouraged people to ask themselves: why not do it ten times faster? Secondly, it seems that the startup ecosystem in Finland is lacking players like Plug and Play to support companies in their development. As a third thing, the role given to social sciences and humanities in drawing the context for different activities was noted, especially at IDEO and Berkeley Center for New Media.

After the feedback, we had dinner with also one Bit Bang alumni present: **Lorenz Lechner**, who had participated to the very first Bit Bang course and who had just moved to Silicon Valley.

After dinner it was time for the Annual Silver Reindeer Awards. Each group had put together a presentation that would be related to what we had seen and experienced during the week. The presentation of Group 1 was inspired by the assembly line at Tesla and its robots, whose movements were like dancing. The presentation of Group 2 had undoubtedly the most beautiful music, live clarinet playing, and they amused the audience by distributing Non-Disclosure Agreements, NDAs – though much simpler than those everyone had had to sign at Google and Tesla. Group 3 organized a quiz, where the audience got to guess what was the favourite thing of each member of the group from the trip. The first prize was awarded eventually to group 4's play, where two PhD student had the amazing opportunity to consult the (somewhat crazy) Professor from the Future.

This book is the 6th in the Bit Bang series of books produced as multidisciplinary teamwork exercises by doctoral students participating in the course **Bit Bang 6: The Future of Media** at Aalto University during the academic year 2013–2014. The course aimed at fostering teamwork and multidisciplinary collaboration, as well as providing the students with global perspectives and business foresight on the future of the media industry.

The media industry is currently undergoing its biggest revolution since the invention of the printing press: digitalization is fundamentally changing the media landscape, and the distribution channels and revenue models of the print and broadcasting industries are being challenged. Digital convergence has changed the media value chain, and the Internet and social media have introduced new players to the game.

Working in teams, the students set out to answer questions related to the changing media industry and to brainstorm radical scenarios of what the future could hold. This joint publication contains articles produced as teamwork assignments for the course, in which the students were encouraged to take novel and radical views on the future of the media industry.

The Bit Bang series of courses is supported by the Multi-disciplinary Institute of Digitalisation and Energy (MIDE). Previous Bit Bang publications are available from *http:/mide.aalto.fi*.

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